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PART V.

FLORA PATAGONICA.[1]

FLOWERING PLANTS.

BY

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NOTE ON THE DESCRIPTIVE LIST OF FLOWERING PLANTS.

For the convenience of botanists this part aims to gather in one general list the descriptions of the Patagonian Flora which are scattered over many books. Extreme condensation is required by the limitations of space; and as we deem a natural serial arrangement of species an impossibility, we have placed the species of each genus in alphabetical order, which facilitates reference. In order to minimize the labor of identification, all the larger genera are provided with an artificial key to the species, whereby any plant may be paralleled with its congeners, and its name provisionally obtained for comparison with its diagnosis in the ensuing alphabetical arrangement.

The arrangement and diagnoses of the families and genera are in accord with Engler and Prantl's *Pflanzenfamilien*, with occasional help from the writings of Bentham, Gray, Britton and others. Immediately after the descriptive list we give an analysis of the Alliances and Families of the Flowering Plants of the area; this follows the method of Engler and Prantl, as modified by Coulter and Chamberlain.

[1] For Conspectus of Orders and Familes see below, Part VI.

Subkingdom PHANEROGAMIA (SPERMATOPHYTA). Flowering or Seed-bearing Plants.

The sexual generation is so far reduced as to be apparently obsolete; the non-sexual generation, or sporophyte, is advanced, heterosporous, with conspicuous secondary sexual characters which constitute flowers; the female sporophyls bear carpellary leaves, ultimately supporting seeds which contain the embryo; the male sporophyls form stamens and bear pollen.

Section 1. GYMNOSPERMÆ.

Trees or shrubs with unisexual flowers, in which the germinating pollen forms prothallium-cells, one of these in each pollen-grain developing into a siphonal antheridium; the scale-like ovuliferous carpels not developing into a closed ovary around the seeds.

Class I. CONIFERÆ.

Stems branched, without ducts in the wood, but usually with some resiniferous canals. *Leaves* simple, mostly small or needle-formed. *Flowers* naked, mostly in cones, the staminal in catkins.

Family 1. PINACEÆ. Pines and Firs.

With regular cones having seeds inserted between their scales. Seed-coats leathery or woody or bony. No outer integument (arillus).

Leaves spirally arranged. *Seeds* usually inverted.

Section Araucarineæ has the carpels single (no division into cover and fruiting scale; but sometimes a tooth-like scale on the inside). Seed only one in each carpel, inserted on its center and inverted.

ARAUCARIA Juss. Chilian-pine.

Cones terminal, on normally or abnormally-leaved short shoots; the *male* cones cylindric-conical, large, stamens very numerous, pollen-sacs linear, 8–15 in a close ring. *Fertile* cones globular, ultimately breaking up.

Carpels sometimes under the point of a tooth-like ligule, woody, cuneate-prismatic. *Endosperm* mealy. *Cotyledons* 2–4. Large evergreen trees with naked buds. *Leaves* large, scale-like, or short and needle-form, sessile with a broad base, and partly decurrent. *Fruit* ripening in 2 years.

Species about 6 : South America and Australasia ; some fossil.

A. IMBRICATA Pav.

Branches horizontal or depressed, the ends ascending again. *Leaves* lanceolate, pungent, stiff, closely imbricate-appressed. *Stamens* and *carpels* long-pointed.

South Chili, about 35–40° S. lat., along with *Fitzroya patagonica* forming woods at high altitudes (to 1,000 meters), and yielding both timber and edible seeds. In islands of Lago Nahuelhuapi.

Dusén describes a fossil *Araucaria nathorsti* Dus., in the Tertiary at Punta Arenas. Its leaves are like those of *A. imbricata*, but not long-pungent at the apex. The silicified wood of *Araucarioxylon schleinitzii* Goeppert occurs both in Magellan and on Kerguelen Island.

Araucarites ovatus Hollick is fossil in the Cretaceous beds of New New Jersey, U. S.

Family 2. CUPRESSACEÆ. Cypress Family.

Leaves cyclic in whorls of 2–3–4. *Cones* woody or fleshy. Seeds 1–many in each carpel, usually upright. Stamens 4–5 in a whorl. Pollen not winged.

1. FITZROYA Hook. f.

Tree with 3-merous whorls of lanceolate leaves (in the Patagonian species, but a shrub and 2-merous in the Tasmanian). Round small *cones* having 2–3 pairs of carpels. Upper *carpels* 3-seeded (no seeds in the lower carpels).

F. PATAGONICA Hook. f.

A stately tree with minute spreading lanceolate leaves.

N. Patagon. even in swampy woods; by Valdivia, and Lago Nahuelhuapi.

2. LIBOCEDRUS Don.

Trees or shrubs, the *leaves* 2-whorled (by crowding 4-whorled), of two forms, the front-leaves on the branches small, appressed and scale-like, the side-leaves long with the apex free. *Cone* woody, having only 4, rarely

6, unequal scales, the outer ones smaller; and 4 carpels, the upper pair each 2-seeded. *Seeds* each with a large and a small wing. (Fig. in Eng. & Prantl., ii, 1, 97.)

L. TETRAGONA Endl. (*Thuja t.* Hook.)

Bark reddish; the strobiliferous branch exceeding the strobile.

S. & W. Patagon.; Magellan through Fuegia to Cape Horn; under the snow-line of the mountains; the only "needle-tree" of the Magellan lands. Common in islands of Lago Nahuel-huapi. Stem varying according to place from 50 centimeters to 50 meters high. This genus has species in S. Chili, California, China, Japan, New Caledonia and New Zealand. Allied to the amber-trees of Europe and North Greenland. *L. chilensis* Endl. with *branches* compressed and *leaves* acute, and strobiliferous branch shorter than the strobile, extends southward in the Chilian Andes to Valdivia, 40° S. lat.

Family 3. TAXACEÆ. Yew Family.

Cones incomplete: seeds exposed, with an epimatium, or excrescence from the carpel; often a fleshy cup.

Subfamily *PODOCARPEÆ*.

Seeds more or less inverted, only 1 to each carpel. *Stamens* with 2 pollen-sacs; *pollen-grains* with wings. Flowers mostly diœcious.

(1) Scales of female cone very few or many, often fleshy, spirally crowded.

1. SAXEGOTHEA Lindl.

An evergreen tree with linear plane to needle-shaped *leaves*, in 2 divergent rows. *Carpels* numerous, the scales at length fleshy and coalescing into a round fleshy *cone* opening downwards. Monœcious.

Species 1, viz:

S. CONSPICUA Lindl. (*Taxus patagonica* Hort.)

Leaves with 2 white stripes underneath.

Only in lower regions of the Patagonian Andes and in Chili.

2. PODOCARPUS l'Her.

Trees or shrubs, with spiral, rarely opposite *leaves*, which are flat-needle-form or broad, and pungent, the margins revolute. Fruiting *peduncles*

1-flowered, very short. *Seeds* each exceeding its carpel; the whole in an outer aril resembling a drupe.

P. NUBIGENA Lindl.

Leaves linear-mucronate, glaucous underneath. *Peduncles* shorter than the obliquely 2-lobed obovate receptacle. *Fruits* oblong, apiculate.

With *Fitzroya* near Valdivia and southward in Chili and West Patagonia.

The genus has 40 species scattered over the southern hemisphere. *P. spicata* Br. of New Zealand and *P. andina* Poepp. of South Chili are closely allied.

(2) Scales of female cone 4, united below to form a woody cone which is enclosed by 4 upper enlarged leaves.

3. DACRYDIUM Sol.

The *pistillate* flower solitary at the top of the branches. *Fruit* an ovoid nut in a firm rugose integument, with involucrate bracts.

Species 12, in Malaya, Tasmania, New Zealand, Fiji, Australia; few in Africa; the following in Chili and Patagonia. Some are tall trees.

D. FONKI (Phil. sub *Lepidothamnus*) Benth.

Dwarf; with crowded small scaly leaves, and also spreading leaves.

(Chilian Andes to 44° S. lat.); Patagonia, near Lago Argentino; Wellington Island, Port Eden. (Fig. 27.)

FIG. 27.

Dacrydium fonki. Branch with floral shoot; and enlarged view of young flower, of fruiting shoot, and section of fruit. (After Franchet.)

Class II. GNETACEÆ. Joint-firs.

Stems simple or branched, often jointed, with ducts in the wood, but not resinous. *Leaves* opposite, simple, often reduced to scales. *Flowers* with a small, 2–4-merous perianth. *Seeds* in the Patagonian forms fleshy, like small grapes.

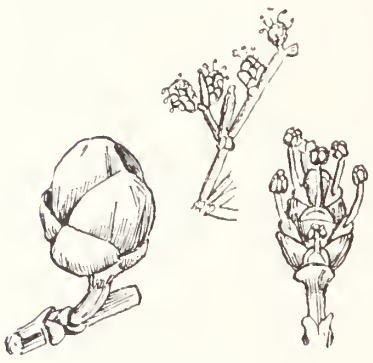
Family 4. EPHEDRACEÆ.

Characters of the genus, viz:

EPHEDRA Linn. Joint-firs, Sea-grapes.

Leafless shrubs, with many *branches* jointed at the nodes, longitudinally grooved like Equisetum, the branches opposite or fascicled and subtended by pairs of leaf-scales which represent the reduced leaves. *Flowers* mostly dioecious, the male flowers in compound inflorescences, each with a 2-leaved perianth, and bearing 2–8 anthers on a common axis. The *female* flowers having a tubular perianth contracted above, around one erect ovule, whose integument emerges as a tube-like micropyle; in spikelets of 2–8. *Fruit* berry-like from red fleshy bracts. (Fig. 28.)

FIG. 28.



Ephedra nana. Branch, natural size; female and male flowers, enlarged. (After Dusén.)

Species 30, over the Mediterranean region (Tyrol to North Africa) the Himalayas, Altai, Orient, mountains of America, from California by Texas to Chili, Argentina, and North and South Patagonia.

Sometimes the fruit is used medicinally and as food. "At Pingo-pingo in Atacama the mules eat the branchlets of *E. andina* (Poepp.) and men eat the fruit sc. the red fleshy bracts which are insipid." (R. Philippi.)

(1) Monœcious.

1. E. AMERICANA Humb. & Bonpl.

Much branching, the *branches* fasciculate, terete, striate, with bifid sheaths in the young branches ending in subulate leaves. *Male* catkins 1–2, sessile at the joints; *anthers* 4–7, sessile, making a globose head on a

short style. *Female* catkins 1–several, subsessile, 2-flowered. *Involucres* 4–6, deeply bifid, the uppermost equalling the oval pistils.

N. Patagon. and by the Andes to Quito.

2. E. TWEEDIANA Fisch. & Mey.

Subscandent shrub. Sheaths short, deeply bifid laciniate. *Male* catkins aggregate at the joints, sessile; *anthers* 4–5, scarcely stipitate. *Female* catkins solitary or aggregate, sessile or nearly so, 2-flowered; the upper involucre bifid to the middle, as long as the ovate-oblong pistil.

N. Patagon. and Argentina.

(2) Diœcious.

3. E. FRUSTILLATA Miers.

A stunted shrub 10 cm. high with creeping caudex and reddish-brown sulcate branches. Internodes only 12 mm. long, with whorled branches at the nodes; 2 sheathing leaf-scales round each node. Male and female plants similar; flowers on the ultimate branchlets. *Male* catkin solitary, terminal with 4–6 pairs of decussating imbricating bracts. Anthers 5, globose, sessile on the exserted staminal column. *Female* plant crowded with larger dark-brown flowers, 4 at each node on short peduncles.

Chubut; S. Patagon. (Rio Sta. Cruz, J. B. Hatcher, Dec. 28, 1896.)

4. E. OCHREATA Miers.

Shrub with virgate branches and stout striatellate branchlets; internodes 5 cm. long with 3–4 leaf-scales 8 cm. long, united into a sheath ending in long excurrent points. *Male* catkins sessile, 4 at each node, enclosed by the sheath; containing each 25–30 flowers. *Female* catkins short-peduncled, 2–4 at each node with 5-seriate involucre of decreasing pairs. *Fruit* as 2 terminal achenes, turning downwards, with the apical micropyle scarcely exserted.

S. and N. Patagon. and Argentina.

5. E. PATAGONICA Phil.

Very branching. Internodes only 9 mm. long, striate, sulcate and smooth. Sheaths little cleft, the uppermost divided into broad-ovate lobes. *Male* catkins usually solitary on the peduncles. Anthers 3–4, rarely 5; staminal column scarcely exceeding the involucre. *Female* catkins solitary, 4-flowered; scales of involucre ovate, narrowly margined.

S. Patagon.; Lake Pinto.

(Possibly the same as *E. frustillata.*)

Section II. Angiospermæ.

Flowering plants whose carpels become closed ovaries, and are surmounted by stigmas which receive the pollen and conduct the growing pollen-tubes to the enclosed ovules.

Class I. MONOCOTYLEDONES.

Seeds with a monocotyledonous embryo. *Flowers* usually 3-merous. *Stem* endogenous. *Leaves* mostly with parallel venation.

Including families 5–21; also the palms and several other families which are not found in Patagonia.

Family 5. Typhaceæ. Cat-tail Family.

Marsh or aquatic plants with creeping rootstocks and glabrous erect terete stems. *Leaves* long-ensiform. *Flowers* monœcious, in dense terminal spikes. *Male* flowers above; each with 2–7 stamens. *Ovary* 1–2-locular. *Perianth* of bristles; other bristles inwards. *Seeds* with endosperm.

Typha, the only genus. Species 10, in temperate and tropical regions.

TYPHA Linn.

1. T. angustifolia Linn.

Stem slender. *Leaves* 4–12 mm. broad. *Spikes* light brown, a gap between the staminate and pistillate flowers. *Stigmas* linear. *Pollen-grains* simple.

(Eurasia and E. United States.) Argentina and North Patagonia; in swamps near Carren-leofú.

"Cosmopolitan; probably disseminated by water-birds." (J. Ball.)

2. T. domingensis Pers.

Robust, 2–4 meters high. *Leaves* 5–10, plane, the lower 20 mm. broad. *Spikes* mostly remote. Hairs of *male* spikes rusty-brown, mostly dilated at apex, with curved branches. *Female* spike brown; flowers bracteolate, pedicels 1 mm. long. Hairs apically brown, shorter than the stigmas.

Texas and southwards to Argentina and North Patagonia and West Indies.

Family 6. POTAMOGETONACEÆ. Pondweed.

Submerged plants with kotty-jointed stems and alternate (rarely opposite) leaves. *Flowers* small, 1-sexual or hermaphrodite, regular, perianth 4-leaved or none or a cup. *Anthers* 4 or 2, sessile. *Carpels* 1 or more, usually free; each with 1 pendent seed. *Achenes* hard or leathery. Endosperm none.

Species 25, chiefly of temperate zones.

KEY TO THE GENERA.

1. Flowers naked, at length long-stalked. Leaves slender, acuminate. In brackish water. 1. *Ruppia.*
2. Sepals 4. Flowers spicate. Leaves of two kinds, the floating broader than the submerged. Chiefly in fresh water. 2. *Potamogeton.*

1. RUPPIA Linn.

Stems capillary, branching. *Leaves* slender, 1-nerved, acuminate, with thin sheaths. *Flowers* monœcious, in a spathe, at length long-peduncled, having two sessile anthers and two sets of *pistillate* flowers on opposite sides of the rachis; without perianth (or a single hermaphrodite flower having 2 stamens and 4 carpels). The *male* flowers fall off and after fertilization the peduncles twist, drawing the ripening fruit below the water.

R. MARITIMA Linn.

Leaves 2–7 cm. long, .5 mm. wide. Drupes stipitate, 2 mm. long. (Cosmopolitan, in brackish water); S. Patagon. (Dusén).

2. POTAMOGETON Linn. Pondweed.

Leaves flat, often of two kinds, submerged and floating; the floating being firmer and broader. *Spathes*, or stipules, at base of the leaves or the petioles, and usually perishing soon after expanding. *Peduncles* axillary, usually emersed, bearing a spike of small flowers. Perianth-leaves, stamens and carpels each 4. *Seeds* curved.

Species 65, in temperate regions.

KEY TO THE SPECIES.

a. Leaves floating and submerged.
  b. Stipules free. Fruit pitted.
    c. Submerged leaves reduced to petioles. *natans.*
    c2. Submerged leaves with lamina. *fluitans.*

b2. Stipules 2-ribbed, persisting. Submerged leaves tongue-shaped. Fruit keeled and beaked. *linguatus.*

a2. Leaves all submerged.

b. Stipules free.

c. Leaves narrow-oblong, serrulate, 3–7-nerved, glandless. Fruit beaked. *crispus.*

c2. Leaves linear, with 2 small basal glands. Fruit ellipsoid.

d. Leaves 5–7-nerved. Fruit laterally 2-pitted. *friesii.*

d2. Leaves 3-nerved. Style short. *pusillus.*

b2. Stipules half-adnate. Leaves setaceous. Fruit scarcely keeled. *pectinatus.*

b3. Stipules adnate. Leaves linear. Fruit 3-keeled. *interruptus.*

1. P. CRISPUS Linn.

Leaves 2-ranked, linear-oblong or oblanceolate, alternate or opposite, sessile or amplexicaul, obtuse, crisped serrulate, the midrib often compound with submarginal outer nerves. *Stipules* small, scarious, evanescent. *Peduncles* 4 cm. long. Spikes 12 mm. long, bristly, having beaked drupelets. *Fruit* ovoid; also with winter-buds. (Britt. & Br. i, 72.)

In ditches and sluggish streams of temperate regions.

2. P. FLUITANS Roth.

Like *P. natans*, but the submerged leaves have a lamina; *leaf-stalks* flat on the upper sides; floating leaves long-petiolate, lance-ovate, attenuate both ways, rounded or narrowed at the base. Rachis thicker than the peduncle.

In temperate and tropical climates, by J. B. Hatcher in S. Patagon.

3. P. FRIESII Ruprecht.

Stems compressed, branching. *Leaves* about 10 cm. by 2 mm., mostly 5-nerved, with 2 small glands at the base. *Stipules* white-hyaline, about 20 mm. long. *Peduncles* 3 cm. long; spike interrupted; *drupelets* ellipsoid, dorsally grooved, with a pit on each side; style recurved.

(Temperate parts of Eur. and N. Am.); Rio Coy, Patagon. (J. B. Hatcher, Jan. 16, 1897.)

4. P. INTERRUPTUS Kitaibel.

With running rootstock often from a small tuber; branching fan-wise. *Leaves* linear, 10 cm. long, 2–2.5 mm. wide, 3–5-nerved and also transversely. Some plants with narrow 1-nerved leaves. *Stipules* adnate to leaves. *Peduncles* 25–50 mm. long. *Spikes* slightly interrupted. *Fruit* obliquely obovoid, keeled.

Eur. and N. Am., in ponds.

5. P. JUNCIFOLIUS Kerner.

In N. Fuegia (P. Dusén).

6. P. LINGUATUS Hagstr. n. s.

Stem rigid, emitting near the floral leaves a spiciferous branch with coriaceous leaves. Internodes equal in length, 4–5 cm. Submerged *leaves* thin, entire, lanceolate-lingulate, obtuse, the lateral principal nerves connected with the midnerve half way up. Floating leaves coriaceous, oval-subcordate, petiolate, with persisting, 2-costate stipules. *Peduncle* 7–10 cm.; spike 3 cm. *Fruit* dorsally carinate when dry and apically subrostrate.

S. Patagon.

Caulis 30–50 cm. altus, rigidus, teres vel subteres, 3–7 mm. crassus, ad folia floralia ramum spiniformem foliis vere coriaceis emittens, ceterum simplex vel vix ramosus; internodia fere æquilonga (4–5 cm.); folia submersa tenuia, integerrima, lanceolato-lingulata, obtusa, lamina 9–10 cm. longa et 2.5–3.5 lata, petiolo brevi (10–25 mm.), nervis lateralibus principalibus fere ad medium folii cum costa centrali connexis; folia floralia longe petiolata (8 cm.), ovalia, vix coriacea; folia natantia coriacea, obtusa, ovali-subcordata, longe petiolata, lamina c. 8 cm. longa et 3.5 cm. lata; stipulæ 4–6 cm. longæ, persistentes, bicostatæ, costis validis, ad basin stipularum valde prominentibus (costa crassitudinem stipulæ 3–4plo superans); pedunculus 7 cm. longus; spica mediocris, 3 cm. longa; stigma parvum, ovale (ut videtur); fructus 3.5 mm. longus et 2 mm. latus, apicem versus in parte dorsali siccus, conspicue carinatus, lateribus convexis, apice inconspicue rostrato.

Hab. Patagonia australis, Kark. (30/3, 1899).

7. P. NATANS Linn.

Floating leaves on long stalks, ovate-elliptical, many-nerved, cusp-pointed, basi-cordate. Submerged leaves reduced to bladeless petioles. *Stipules* long. *Spikes* cylindrical; *achenes* large, 4.5 by 2.5 mm., pitted on the sides, grooved on the back.

(Temperate N. Am. and Eur.; Chili); W. Patagon. and E. Fueg. (P. Dusén).

8. P. PECTINATUS Linn.

Leaves all submerged, setaceous, alternate upwards, 1-nerved; *stipules* half adnate, scarious-margined; *peduncles* filiform; flowers verticillate; *stigma* capitate on a short style. *Fruit* obliquely obovoid, scarcely keeled.

(N. Am. and Eur.; Cuba; Andes); S. Patagon. (Hatcher).

9. P. PUSILLUS Linn.

Stem compressed-terete, very slender, branching. *Leaves* all submerged, linear, 3-nerved, alternate or opposite, sheathing at the base; *stipules* connate, distinct from leaf, with a gland at their base. *Spike* stalked, slender, interrupted, 3–10-flowered. *Peduncle* 2–3 times longer.

(Eur.; N. Am.); S. Patagon., by Gregory Bay; Fuegia.

Family 7. JUNCAGINACEÆ. Arrow-grass Family.

Marsh-herbs with glabrous narrow rush-like radical *leaves*, sheathed at base, and small inconspicuous 6- or 4-merous *flowers* in a spike or a raceme. *Perianth* 2-seriate. *Stamens* 6 or 4, hypogynous, the anthers extrorse, subsessile. *Carpels* 3–6, 1–2-ovuled, more or less united. *Embryo* straight; endosperm none. (Ovules solitary in the Patagonian forms.)

KEY TO THE GENERA.

1. Flowers 4-merous.	*Tetroncium.*
2. Flowers 6-merous.	*Triglochin.*
3. Flowers 1-merous. Chilian Andes.	*Lilæa.*

1. TETRONCIUM Willd.

Flowers 4-merous, diœcious. *Styles* distinct. *Staminate* flowers with

FIG. 29.

Tetroncium magellanicum. Herbage (below, to right); flower and floral spike; fruit and fruiting spike. (After *Flora Antarctica.*)

the perianth-leaves colored, concave, unequal, broad-ovate; stamens inserted on their base. *Pistillate* flowers with narrower perianth-leaves. *Carpels* 4, united at base, separating above; each 1-ovulate, but only 1 seed maturing.

Only species:

T. MAGELLANICUM Willd.

Fruits directed downward on the spike. Habit of *Triglochin maritima*. Magellan (Dusén); Fuegia to Cape Horn; Falklands. (Fig. 29.)

2. TRIGLOCHIN Linn.

Marsh-herbs with ligulate *leaves*, and 6-merous hermaphrodite *flowers* racemed on a long naked scape. *Fruits* of 3–6 carpels, at length separating from the axis, opening ventrally. (Fig. in Eng. & Pr. ii, 1, 224. A-H.)

Species 9, in temperate and cold regions.

1. T. MARITIMA Linn. Seaside Arrow-grass.

Caudex thick, sheathed by old leaves. *Scape* stout, 15–20 cm. high. *Leaves* semi-cylindric, 3 mm. wide. *Raceme* to 30 cm. long, crowded with flowers on short ascending pedicels. *Fruit* ovoid, with recurved styles.

In the cold and temperate parts of the northern hemisphere, in saline and maritime marshes. In the southern hemisphere known only at Magellan, and Brecknock Pass, and by Rio Deseado.

2. T. MICROPHYLLA Phil.

Fruits irregularly and broadly winged; but the wings not entire as in *T. alata*.

Patagonia.

3. T. PALUSTRIS Linn.

Leaves linear, long-pointed, shorter than the scapes. *Racemes* 12–30 cm. long, pedicels capillary. *Fruit* linear, tapering basewards, of 3 united carpels. Stigmas sessile.

(Eurasia; N. of N. Amer.); S. Patagon., by Rio Sta. Cruz, Magellan, and Gregory Bay; Fuegia.

4. T. STRIATA Ruiz & Pavon.

Rhizome stoloniferous. *Leaves* linear, semi-cylindric, almost equalling the scape. *Raceme* many-flowered, flowers brevi-pedicillate, erect-spreading. Inner stamens often abortive. *Fruit* globose; carpels of ripe fruit 3.

T. STRIATA FILIFOLIA.

Rarely exceeding 25 cm. high, the *leaves* narrowly linear or filiform, often longer than the scape. Sir Joseph Hooker says (Flor. Antarct. ii, 360) that it greatly varies in size, the scape sometimes exceeding, sometimes being shorter than the leaves.

T. STRIATA HUMILIS.

Scape 1-flowered, shorter than the leaves. Fruit ovoid, of 6 carpels. *Leaves* linear to filiform.

(Found in New Zeal., Tasmania, Australia, Auckland I., Chili, S. Brazil, Argentina, Peru, and thence northwards to the S. United States; also in South Africa.) At Rio Coy, S. Patagon. by O. A. Peterson, Dec. 17, 1896. (This has leaves shorter than the scape, pedicels 4 mm., fruit 3 mm.)

Family 8. ALISMACEÆ. Water-plantains.

Aquatic or marsh herbs, usually glabrous, with fibrous roots, scapose stems, sheathed by basal, long-petioled leaves. Flowers racemed or panicled, regular, with whorled pedicels subtended by bracts. Sepals 3; petals 3, larger, imbricated. Stamens 6 or more. Carpels superior, mostly numerous and separate, 1-celled, usually 1-seeded. Seeds and embryo curved. No endosperm.

Species 70, cosmopolitan by fresh water.

1. ECHINODORUS Rich.

Each floral verticil with 3 outer bracts and many inner bracteoles. Petals white; receptacle large, subglobose. Stamens 12–30. Achenes ribbed and beaked, forming spinose heads.

Species 14, mostly American.

1. E. GRANDIFLORUS (Cham. & Schl. sub *Alisma*) Michel.

Leaves cordate, obtuse. *Raceme* simple or compound, many-flowered. *Petals* twice as long as the calyx. *Style* uncinate.

(S. Brazil); frequent near Rio Negro, by Carmen de Patagones.

2. E. PATAGONICUS Speg.

Striate leaved, simply-scaped, subdecandrous, low. *Leaves* membranaceous, ovate-cordate or subhastate, with obtuse lobes and apex, 5–7-nerved. *Scapes* trigonous, exceeding the leaves, bearing 2–3 verticils with 3–6 flowers in each verticil; pedicels long; flowers small; *stamens* erect, flavescent. *Carpels* very many and small, dimidiate-obovate, laterally compressed and nervose, with a long gland between the nerves. *Style* subterete, as long as the carpel.

N. Patagon., Neuquen near Fort Roca.

2. SAGITTARIA Linn. Arrowhead.

Perennials with nodose rootstocks, the leaves long-petioled, nerved and with cross-veins, or reduced to bladeless phyllodes. Flowers monœcious or dicœcious, the staminate usually uppermost in the panicle. Verticils 3-flowered, 3-bracted. Petals white. Achenes in globose heads. Leaves often arrow-shaped.

Species 30, in temperate and warm climates.

S. MONTEVIËDENSIS Cham. & Schlecht.

Leaves sagittate, rough on the margin and on the nerves and veins of the under surface. Anthers linear, yellow. Filaments longer than the anthers, subulate, hirt.

(S. Brazil); N. Patagon.; common near Rio Negro by Carmen.

Family 9. VALLISNERIACEÆ. Tape-grass.

Submerged and floating long grass-like herbs, with regular dicœcious flowers appearing above a 3-leaved remote spathe. Inner perianth petaloid. Ovary 1-locular, with 3 parietal placentæ. Fruit ripening under water, indehiscent. Seeds numerous.

VALLISNERIA Linn.

Floating in quiet streams. Staminate flowers minute, many in the spathe, on a short scape early separating and floating freely on the surface of the water. Pistillate flowers solitary on a very long spirally twisted scape, the perianth-tube adnate to the ovary, with three small petals. The scape by unrolling elevates the pistillate flowers to the surface, where they

are hydrophilously fertilized. They are then submerged again and ripened under water. Fruit long-cylindric, crowned by the perianth.

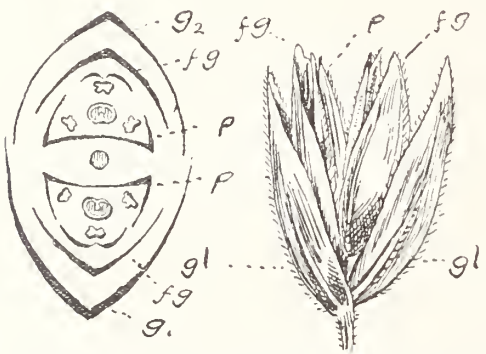
V. SPIRALIS Linn.

In the warmer parts of both worlds, and in temperate North America. In a brook by Rio Chico de Sta. Cruz, Patagon. (J. B. Hatcher, the young plants on March 27, 1897).

Family 10. GRAMINEÆ. The Grasses.

Herbs (or rarely in the tropics woody plants), with terete hollow *stems* and *nodes* solid (the whole stem is solid in a few), and with narrow 2-ranked parallel-veined *leaves*, sheathing at their base and the *sheaths* split in front and liguliferous at their top.

FIG. 30.



Poa kerguelensis. Spikelet and its diagram. *gl, g*, glumes; *fg*, floral glumes; *p, p*, paleæ.

Flowers glumaceous and collected in *spikelets*, each having 1–several flowers. The spikelets arranged in compound inflorescences, as racemes, or spikes, or condensed or lax panicles.

Analysis of a spikelet, proceeding from below upward (Fig. 30):

(1) General part, for the whole spikelet:

Glumes, 1, 2, or 3; mostly 2, equal or unequal: often called "empty glumes"; here mostly called simply "the *glumes*."

(2) Particular part, belonging to the individual flowers:

Palets or glumelles, normally 2 for each flower, viz.

(*a*) the outer or lower palet, often awn-bearing, and commonly termed the "flowering-glume" or "floral glume," which may be conveniently transformed into the single term, *floriglume*.

(*b*) the upper or *inner palet*: it is usually thinner than the preceding, is 2-keeled, not awned; and is usually next the axis, rachilla, of the spikelet. We may call it the *palea*. *Callus* or *anthopodium* is an enlargement of the rachilla below the flowering glume.[1]

Also (*c*) *Lodicules*, 1, 2, or 3 minute '*scales*,' enclosed by the palets, placed either anteriorly, or laterally, or posteriorly.

[1] The German terms are: (spikelet) ährchen; (empty glume) hüllspelze; (floriglume) deckspelze; (palea) vorspelze.

(*d*) *Stamens* 1–many; mostly 3 (the outer series of a double group, 1 being anterior and 2 postero-lateral).

(*e*) The *ovary*, 1-ovuled with inferior external *embryo* ventrad of the large floury endosperm; 2 stigmas, right and left; ripening to a grain (caryopsis).

The term "flower" is used to include one set of the palets and the parts which they enclose.

(3) Above the flowers in a spikelet and occasionally below them may be 1 or more rudimentary flowers with palets and inner organs variously reduced.

(4) In a few genera the whole spikelet is 1-sexual, and the whole plant may be diœcious.

Species about 3,500, growing in all lands; the most useful of the plant-families. [Note (1) the foliage, including the leaf-sheaths, ligules and glabrescence or pubescence; (2) the inflorescence; (3) the parts of a spikelet, and the number of its normal and rudimentary flowers. When not otherwise stated in our descriptions the stamens may be assumed to be 3, and the styles 2 with feathery stigmas.]

Key to the Tribes and Genera.

A. Spikelets 1-flowered, without prolongation of the axis: rarely with an imperfect lower flower. Not flattened laterally. No internode between flowers or glumes. (Andropogoneæ.)

b. Spikelets awnless, on a jointed rachis, easily breaking; silky. 1. *Elionurus*, p. 160.

b2. Spikelets in pairs on a jointed hairy, not thickened rachis. One of a pair perfect and sessile, the other pediceled and male. Each 1-flowered, with 4 glumes; the lowest glume coriaceous, the uppermost (floral) usually awned. 2. *Andropogon*, p. 160.

b3. As *Andropogon*, but spikelets both hermaphrodite.

c. Spike-like panicle woolly. Palea nerveless. Awnless. 3. *Imperata*, p. 161.

c2. Spike slender with jointed, excavated rachis. Rachilla awn-like: palea 2-nerved. 56. *Lepturus*, p. 245.

b4. Spikelets all hermaphrodite, mostly glabrous, separating individually from the pedicel. Glumes 3–4, the floral not awned, more or less coriaceous. (Paniceæ.)

c. Spikelets without sterile valves or bristles or spines.

d. Glumes 3; no callus in the spikelets.

e. Racemed or spiked; the spikes 1-sided, in 2's or panicled. 4. *Paspalum*, p. 162.

e2. Panicled. 5. *Anthœnantia*, p. 163.

d2. Glumes 4 (or the lowest one obsolete); spikelets single, pediceled. Lowest glume short; third empty or male; fourth floral. Panicle either lax or spike-like. 6. *Panicum*, p. 163.

c2. Spikelets with involucres of persistent bristles or spines.

d. Bristles persisting after the fall of the spikelets.

7. *Setaria* (*Ixophorus*), p. 164.

*d*2. Spines forming a bur; falling away with the spikelets.

8. *Cenchrus*, p. 165.

*A*2. Spikelets 1-flowered, monœcious. Aquatic or marsh-grasses, stamens 6 or more. (Oryzeae.)

b. Creeping; male and female flowers in separate panicles. 9. *Luziola*, p. 165.

*b*2. Tall, male and female flowers in the same panicle, the females terminal.

10. *Zizaniopsis*, p. 166.

*A*3. Spikelets 1–many-flowered. When 1-flowered, often with prolonged axis; this is jointed above the empty glumes and persists after the fall of the floral glume and flower. When 2-flowered there is an internode between the flowers.

B. Culm herbaceous, annual. Leaf-blade continuous with (not articulated on) the leaf-sheath and not petioled.

C. Spikelets on pedicels, in lax or spike-like panicles, or in racemes. Rachis not thickened and excavated.

D. Spikelets 1-flowered.

e. Glumes 5, the fifth floral. Palea 1-nerved. (Phalarideæ.)

f. First glume shorter than second. Third and fourth still shorter, awned dorsally, empty. Stamens 2. 11. *Anthoxanthum*, p. 166.

*f*2. Glumes 1 and 2 subequal, 3 and 4 nearly as long, often with a male flower, awnless or shortly awned. Stamens in the hermaphrodite flowers 2.

12. *Hierochloë* (*Savastana*), p. 166.

*f*3. Glumes 3 and 4 small and empty, awnless. Stamens 3.

13. *Phalaris*, p. 167.

*e*2. Empty glumes only 2 (rarely none), equalling or exceeding the floral glume. Palea 2-nerved, grain not grooved. Spikelets stalked. (Agrostideæ).

f. Floral glume hard and close about the ripe grain. Spikelets all fertile.

g. Floral glume entire; its awn 3-parted. 14. *Aristida*, p. 168.

*g*2. Floral glume entire; its awn simple.

h. Lodicules mostly 3. Floral glume and palea becoming hard. Awn long, twisted, persisting. 15. *Stipa*, p. 168.

*h*2. As *Stipa*, but floral glume broad, and its awn very caducous. Cespitose, sometimes tall. 16. *Oryzopsis*, p. 177.

*h*3. Lodicules 2, the anterior pair. Spikelet small, at most coriaceous. Awn short, or a mere mucro. 17. *Muhlenbergia*, p. 178.

*f*2. Floral glume not as hard as the empty glumes, loosely or not at all enclosing the ripe grain.

g. Stigma small, brush-like, protruding only slightly. Spikelets forming a dense or short quasi-spike, the uppermost not sheathed.

h. Empty glumes produced into awns, persisting on the axis. Floral glume much shorter, obtuse, awnless, mostly coming away.

18. *Phleum*, p. 178.

*h*2. Spikelets when ripe easily separating as a whole. Lower pair of glumes more or less united; third or floral glume dorsally awned.

19. *Alopecurus*, p. 179.

g2. Stigmas long, feathery, protruding, rarely remaining enclosed.
h. Fruit stripped of the floral glume and palea; mostly with splitting, loosely attached pericarp. 20. *Sporobolus*, p. 180.
h2. Fruit enclosed in the floral glume and palea, with adhering pericarp.
i. Spikelet at length falling away as a whole, often leaving the stump of its jointed pedicel. Empty glumes 2, awned; floral glume smaller, with a short awn. 21. *Polypogon*, p. 181.
i2. Spikelet leaving the empty glume persisting on the unsegmented hairy pedicel. Panicle mostly lax.
j. Empty glumes exceeding the usually awned floral glume. No prolongation of the rachilla above the palea. Callus bare. 22. *Agrostis*, p. 182.
j2. Rachilla or callus with a hairy tuft prolonged above the palea. Floral glume dorsally awned, hairy. Spikelets all hermaphrodite. 23. *Calamagrostis*, p. 192.

D2. Spikelets 2–many-flowered.
e. Floral glume usually shorter than the empty glumes. Awn dorsal, bent, rarely apical or none, and then with 2 opposite flowers and the rachilla not prolonged. (AVENEÆ.)
f. Spikelets easily deciduous as a whole, 2-flowered, upper flower staminate, with a recurved awn. 24. *Holcus*, p. 196.
f2. Fruiting spikelets separating from the persisting empty glumes.
g. Spikelets always 2-flowered, without prolongation of the axis.
h. Empty glumes coriaceous, broad, many-nerved. Floral glumes long-ciliated. Paleæ naked. 25. *Eriachne*, p. 197.
h2. Both floral glumes and paleæ naked. Flowers close together, equal, perfect. Panicle lax.
i. Empty glume semicircular, and spikelet globular, awnless. 26. *Airopsis*, p. 197.
i2. Empty glumes thin, acute. Flower glumes awned, 2-toothed. 27. *Aira*, p. 197.
g2. Spikelets 2–several-flowered, with the axis prolonged above the second flower.
h. Floral glumes toothed and dorsally awned. Upper flower sometimes sterile. Inflorescence not a true spike.
i. Fruit free, not grooved. Spikelets small, not 1 cm. long.
j. Floral glume finely erose-dentate or 2-lobed. 28. *Deschampsia*, p. 199.
j2. Floral glume cleft or 2-toothed, or the teeth awned, besides the dorsal awn. 29. *Trisetum*, p. 203.
i2. Fruit grooved, mostly adhering to the palea. Paniculate. Spikelet exceeding 1 cm. long. Grain apically hairy. 30. *Avena*, p. 206.
h2. Awn generally twisted and arising between the lobes (often awned) or teeth of the floral glume. Spikelets 3–many-flowered, uppermost flower sometimes imperfect. 31. *Danthonia*, p. 207.

*e*2. Floral glume usually exceeding the empty glumes; not awned or awned only from the point and the awn not bent. (FESTUCEÆ.)

f. Floriglume surrounded by long hairs. Lower flower male or abortive. Tall aquatic. 39. *Phragmites*, p. 212.

*f*2. Floriglume dividing into awn-like parts. Panicle spike-like. 38. *Pappophorum*, p. 211.

*f*3. Spikelets unisexual. Creeping with minute, distichously crowded leaves. 40. *Monanthochloë*, p. 212.

*f*4. Axis of spikelet or floral glume with long hairs (at least in the fertile flowers). Tall, tubular grasses. 41. *Gynerium* = *Cortaderia*, p. 213.

*f*5. Axis and floral glumes naked or with only short hairs. Stigmas feathery. Spikelets all alike.

g. Floral glume 2–3-toothed, usually 3-nerved; lateral nerve and callus usually hairy. Spikelets with 3–several fertile flowers and 2 empty glumes. 42. *Sieglingia* = *Triodia*, p. 214.

*g*2. Floral glumes 1–3-nerved, all with perfect flowers or the uppermost male or empty.

h. Branches or panicles spirally arranged.

i. These branches being spike-formed racemes with subsessile spikelets. Floral glumes carinate. 43. *Diplachne*, p. 214.

*i*2. The branches again branching, shorter upwards. Spikelets dense, many-flowered, with a strong axis. 44. *Eragrostis*, p. 215.

*h*2. Primary branches of panicle distichously arranged (branching further at base).

i. Panicle spike-like. Empty glumes not broader nor longer than the floral glumes. 45. *Koeleria*, p. 216.

*i*2. Panicle expanded with soft, long branches. Empty glumes slightly unequal. 46. *Catabrosa*, p. 216.

*g*3. Floral glume 3–5-many-nerved, all with perfect flowers, or the uppermost male or empty, appressed or embracing. Empty glumes mostly clavate, not awned; floral glumes sometimes awned. 47. *Melica*, p. 217.

*g*4. Floral glumes 5–many-nerved, all or all but the uppermost with perfect flowers, often several empty glumes at top. Leaves without distinct cross-veins.

h. Plant dicœcious. Spikelets sessile. 48. *Distichlis*, p. 217.

*h*2. Plant hermaphrodite (very rarely dicœcious, and then laxly-paniculate).

i. Floral-glumes cordately lobed at the base. 49. *Briza*, p. 218.

*i*2. Floral glumes not basi-cordate.

j. Spikelets panicled or racemed, imbricating or glomerulate. Panicle-branches 1–5.

k. Stigmas 2, apical. Floral glumes, at least of the upper flowers, protruding above the empty glumes.

l. Lateral nerves of floral glumes subparallel, not converging. Empty glumes shorter than the floral.

m. Style developed. Lodicules connate.

50. *Panicularia* (*Glyceria*), p. 219.

m2. Stigma sessile. Lodicules free.

51. *Atropis* p. 220.

l2. Lateral nerves of floral glume arched, converging towards apex. Rachilla naked or downy or hairy.

m. Empty glumes carinate. Hilum punctiform. Floral glume coriaceous at base or herbaceous and webbed. 52. *Poa*, p. 221.

m2. Empty glumes rounded on back. Hilum lineal. Palea rough or ciliate on the keel.

53. *Festuca*, p. 231.

k2. Stigmas 2, arising subapically, on the anterior face of the ovary. Empty glumes awnless.

54. *Bromus*, p. 240.

C2. Spikelets in 2 rows beside each other, forming a 1-sided spike or raceme, with unarticulated rachis; all the spikelets hermaphrodite in the Patagonian species. (CHLORIDEÆ.)

d. Only 1 hermaphrodite flower in each spikelet (very rarely 2).

e. No empty glumes or male flowers. Only rarely a short pedicel extends above the flower. No awns. Spikelets fall off as a whole.

32. *Spartina*, p. 208.

e2. Spikes digitately arranged. Spikelets not falling off.

33. *Capriola*, p. 209.

e3. Empty glumes 1–several, above the hermaphrodite flower; often small or awn-like, rarely enclosing a male flower. Lower empty glumes 2. Spikelets 2–many, often like small fascicles.

f. Spikelets quasi-verticillate, or close together. Floral glume of the perfect flower 1-awned or awnless. 34. *Chloris*, p. 209.

f2. Spikelets 1-, rarely 2-flowered, sessile on subverticillate spikes. Upper empty glume awned, and floriglume 3-awned. Rachilla produced and variously glumiferous. 35. *Trichloris*, p. 210.

f3. Spikelets remote, or approximate below; the flowers close. Paleæ not hairy. 36. *Bouteloua*, p. 211.

d2. Every spikelet having 2–3 hermaphrodite flowers. Spikes 1–3 at apex of culm, erect. Floral glume with 1 awn between 2 obtuse apical lobes.

37. *Tetrapogon*, p. 211.

C3. Spikelets in 2, rarely more, opposing rows on a zigzag axis, forming a symmetrical, rarely a 1-sided spike. (HORDEÆ.)

d. Spikelets solitary in the excavations of the rachis.

e. Spikelets many-flowered, median on the rachis (the dorsal aspect of the glumes being towards the rachis). Glumes subulate, 1-nerved.

55. *Lolium*, p. 244.

e2. Spikelets 1–2-flowered (sides of glumes toward the rachis; in slender articulate spikes). 56. *Lepturus*, p. 245.

*e*3. Spikelets 2–many-flowered, placed sidewise on the axis, mostly in thick spikes, the joints usually not coming apart. Glumes ovate, 3–many-nerved. Floral glume with a callus, falling away when ripe along with a single grain attached to the palea. 57. *Agropyron*, p. 245.

*d*2. Spikelets 2–6 on every segment of the rachis. Stamens 3.

e. Spikelets 1-flowered, with at most the rudiment of a second. 58. *Hordeum*, p. 248.

*e*2. Spikelets 2–many-flowered. Empty glume slightly smaller than the floral. 59. *Elymus*, p. 252.

*B*2. Culm woody at least at base. Leaves often with short petiole, jointed to the sheath. (BAMBUSEÆ.)

Section with 3 stamens; paleæ 2-keeled. Fruit without a soft pericarp. Spikelets 1-flowered, panicled. 60. *Chusquea*, p. 255.

1. ELIONURUS Humb. & Bonpl.

Andropogoneæ, with 1-flowered awnless *spikelets*, some sessile, some pediceled. *Rachis* jointed, easily breaking into segments, the 2-pointed lower *glume* strongly fragrant when fresh or wet, having a balsamiferous gland.

Species 15, chiefly in warm parts of America, and some in Africa, the Orient and Australia. Savanna-grasses, avoided by cattle; the scent seeming to deter them.

E. CANDIDUS (Trin.) Hack.

Leaves filiform, below generally piliferous. *Ligule* composed of long hairs. *Spikes* (7–10 cm.); pedicel of acute male spikelet, and inferior glume of both spikelets white-silky villous. Perennial grass.

(Brazil); N. Patagon., in sandy meadows by Carmen de Patagones, and Bahia de S. Blas. The Patagonian specimens differ from the description by the pilosity of the culms below the nodes, and of the outside of the leaves, which are subtrigonal in section, and with 3 larger nerves, and in the absence of balsam-glands.

2. ANDROPOGON Linn. Beard-grass.

Spikes terminal and axillary, having a jointed hairy axis, with spikelets in pairs at each node, one of each pair being sessile and perfect, the other pedicellate and staminate or rudimentary. Perfect spikelet with 4 *glumes*, of which the uppermost (the flowering glume) is awned and subtends a palea with a perfect flower. (Britt. & Br. i, 100.)

1. A. CONSANGUINEUS Knth.

Culms slender, about 25 cm. high, branching. *Leaves* to 10 cm. long by 1.5–2 mm., rough margined. Spathes 4 cm. long. Racemes lax, subsimple, 6–8-jointed, bearded at the base, with trilobulate appendage. *Spikelets* sessile, rufescent. *Glumes* 1 and 2 with scabrid keels, glume 3 shorter, nerveless, split to near the base, as is the floriglume, no. 4, which has an awn 17 mm. long basally torted; glume 1 linear-subulate, with a bearded callus; glume 2 linear-lanceolate. *Palea* none. *Stamens* 2–3, one of them larger. Pedicels suberect, ciliate, 6–9 mm. long, equalling the joints.

(S. Brazil); N. Patagon., in rocky plains near Rio Colorado.

2. A. SACCHAROIDES Sw.

Culm erect, simple, terete (30–40 cm. high), nodes silky-bearded. *Leaves* linear, subvillous. Panicle compact, linear-oblong, its rays solitary or in pairs, simple or bifid, floriferous from base. *Joint* and pedicel of fading spikelet densely villous. *Awn* twice as long as its villous spikelet.

N. Patagon. (Roca Exped.); Brazil; W. Indies.

3. IMPERATA Cyr.

Perennial grasses of medium height with innovations of long leaves, short *culms*, and spike-like woolly *panicle*, creeping rhizome with scaly stolons. *Spikelets* in twos at the nodes, the primary long-, the secondary short-pediceled, all 1-flowered, hermaphrodite, linear, subcompressed, awnless. *Glumes* 4, of which 1 and 2 are membranaceous, convex; 3 is hyaline, empty; 4 is hyaline, rarely wanting: *palea* always present, broad, hyaline. nerveless, enclosing the *grain*. Lodicules none. Stamens 1–2.

Species 3–4, in tropics of both worlds.

I. ARUNDINACEA Cyr.

Culms about 1 meter high, of 3–4 nodes, glabrous, shortly naked above. *Sheaths* mostly longer than the internodes, at length becoming dry parallel fibers. *Spike-like panicle* 5–20 cm. long, racemes 1–2 cm., of 5–10 internodes. *Spikelets* 4–5 mm.; the villi from the callus 4–5 times as long,

I. ARUNDINACEA CONDENSATA (Steud.).

Nodes of sheath glabrous; ligule 2–3 mm., ovate, obtuse; laminæ of *leaves* sublanceolate-linear, attenuate to a long, slender point, not pungent, the lower 10–15 cm. long, smooth on both surfaces.

(Chili); Patagon., dry meadows near Colonia; Bolson.

4. PASPALUM Linn.

Panicle with 1-sided spikes, the spikes, with 2–4 rows of 1-flowered spikelets. *Glumes* 3, sometimes 2, the upper enclosing a shorter palea with the perfect flower. *Grain* free. (Britt. & Br. i, 105; Eng. & Pr. i, 2, 34, fig. 24.)

Species, chiefly American; many are pampas plants.

1. P. DILATATUM Poir.

Culm erect, glabrous, 60–90 cm. *Sheaths* compressed, the radical more or less villous; *ligule* membranaceous, obtuse or acute, pilose or naked. *Leaves* (sublanceolate-) linear, the radical more than 30 cm., 6 mm. broad. *Racemes* 2–10, scattered, alternately thick, often nutant, 4–10 cm. *Rachis* glabrous, rather narrow. *Spikelets* 4-seriate, sublinear, unequally pediceled, ovate, acute (depressed), marginally villosulous. *Glumes* 5-nerved. Perennial grass.

(S. Amer.); N. Patagon., along Rio Negro near Carmen, not rare in herbage.

2. P. DISTICHUM Linn.

Culms creeping. *Leaves* flat (2–4 mm. broad), acuminate, smooth. *Spikes* 2, Y-like, occasionally 3. *Spikelets* oval, acute.

N. Patagon. (Roca Exp.); N. and S. Amer.

3. P. ELONGATUM Gr.

Stout, erect, 1 m. high. *Leaves* 18 cm. long, linear-acuminate; sheath long, *ligule* very short, truncate, ciliose. *Panicle* long, with many alternate branches; its spikelets 4-seriate, elliptical, obtuse, unequally pedicelled, glabrous. Sterile *glumes* remote from the rachis, 3-nerved; *floral glume* 5-nerved.

N. Patagon. (Roca Exp.); Argentina.

4. P. LEUCOPHÆUM H.B.K.

Culm erect, tall, 60–180 cm., it and its nodes scabrous. *Leaves* linear, acuminate, scabrid both surfaces and margin (20–35 cm. by 4–8 mm. wide). *Sheaths* lax, from hairy tubercles; *ligule* short, rounded. *Racemes* numerous, dense, verticillate, subfastigiate. Pedicels short, or equalling the spikelet; this 4–6 mm., linear-lanceolate, densely woolly.

(S. Amer.); N. Patagon., in sandy meadows near salina at Carmen.

5. P. PUMILUM Nees.

Root densely fibrous, cespitiferous. *Culm* simple, ascending, paucinodal (15–25 cm.), filiform, glabrous. *Leaves* lax, glabrous to soft-villous; *ligule* very short; blades lance-linear (25–50 mm. long, 5 mm. broad), acute, plane, pubescent or villosulous. *Racemes* approximate in pairs. *Rachis* plane, narrower than the solitary spikelets; these 1.5 mm. long. *Glumes* orbiculate, elliptic, obtuse, glabrous, the lower 5-, the upper 3-nerved. Perennial.

(Brazil); N. Patagon., wet places by Rio Negro, near Carmen.

5. ANTHÆNANTIA Beauv. (R. & S. sub. *Milium.*)

Erect grasses with oblong, lax, more or less silky *panicles*, having filiform rays and pedicels. *Spikelets* articulating on the pedicels, having 3 *glumes*, the uppermost or floral glume, enclosing the palea and a hermaphrodite flower, the second slightly larger and empty, or having a male flower, the lowest glume the largest. *Grain* freely enclosed in the pergamentaceous glumes.

Species about 5, from California to Patagonia. (By O. Ktze. made a section under *Panicum.*)

A. LANATA Benth. (*Panicum insulare lachnanthum* O. Ktze.)

Culm erect. Leaves subinvolute or pilose on upper surface, the lower sheaths villous. *Panicle* jubate, its rays whorled. *Spikelets* acute, 3 mm. long. Lowest *glume* 5–7-nerved, villous-woolly, acute, exceeding the flower. "Border of third valve, and whole of second valve glandular-hairy; small first valve under the third, naked."

(Surinam, Brazil); N. Patagon.

6. PANICUM Linn.

Branches of panicle either simple or again divided. Pedicels jointed under the spikelets. The spikelets 1–2-flowered, when 2-flowered the lower is staminate only. Glumes 4, the lowest awnless and very small. Thus there are three empty glumes, or two empty glumes with a staminate flower in the third. Grain free, in a hardened fruiting scale. (Brit. & Br. i, 2, 113.)

Species 300, cosmopolitan in warm climates; few in Chili.

1. P. CHLOROLEUCUM Griseb.

Rush-like perennial, branching at the base, 30–40 cm. tall, ascending, glaucous-white, woolly at nodes and ligules. *Leaves* arcuate, as long as the culm, linear-acuminate, convolute, hairy. *Panicle* patent, 12 cm. long, its branches woolly, paired or solitary, racemiform or branched. Sterile *glumes* 3, equal, ovate, acute, 5–7-nerved, slightly exceeding the 5-angled compressed obtuse floral glume. N. Patagon. (Argentina).

(*P. lachnanthum* O. Ktze. (Torr.) = *Anthænantia lanata* Benth.)

2. P. MAGELLANICUM Lam.

Spikes filiform, fasciculate. *Glumes* pediceled, oblong, acute, very slender.

Magellan.

3. P. URVILLEANUM Kth. (*P. patagonicum* Hier.)

Perennial with branching base, glaucous white, and ascending *culms*, 60 cm., hard, distichously leafy at base. *Nodes* glabrous or villous. *Leaf-sheaths* velvety, with reversed hairs, 15 cm. long, 1 cm. broad; *laminæ* 25–55 cm. by 4–5 mm., linear-acuminate, terete, not scabrid. *Ligule* densely villous. *Panicle* patent, with triquetrous alternate racemiform branches, sucessively long and short. *Spikelets* velvety, subsecund. *Sterile glumes* 3, ovate, hairy on back, the lowest 5–7-nerved, the second 13-nerved, the third 7–9-nerved, with a neutral flower. *Floral glume* 7-nerved, coriaceous.

(Chili; Argent.); N. Patagon., by Rio Negro and the coast.

7. SETARIA Beauv. (*Chamæaphis* R. Br., *Ixophorus* Schl.)

Annuals with spike-like *panicle*, awnless, but with awn-like branches projecting above the spikelets. *Glumes* 4; 1 small, 2 and 3 equal or 3 larger, all membranous; the third enclosing a male or neuter flower; the fourth, or flowering glume, enclosing the perfect terminal flower, is firm, and at length indurated along with the palea about the grain.

Species 35, in warm and temperate regions.

1. S. GLAUCA Beauv. Yellow Foxtail.

(*Ixophorus glaucus* in Brit. & Br. i, 126.)

30–60 cm. high. *Leaf-sheaths* smooth, loose, the lower compressed, reddish; *laminæ* flat, scabrous, twisted. *Spike* simple, cylindrical, tawny

when mature, bristles pointing upward. *Floral glume* oval, coarsely rugose across.

(Eur. & N. Amer.); N. Patagon.

2. S. SETOSA Beauv. (*S. caudata* Roem. & Sch.)

60–90 cm. high. *Culm* slender, erect, flattened, branching below, nodes glabrous. *Leaves* scabrous, twisted, flat, blades to 20 cm. long, 4 mm. broad, apex long, slender. *Panicle* interrupted cylindrical, 18 cm. by 7 mm., its axis pilose; bristles 1–3 to each spikelet, 3–10 mm. long, pointing upwards. *Spikelets* 3 mm. long; first glume broad, 3-nerved; second and third glumes equal, a neutral flower in the third; which is 7-nerved. *Palea* small. *Floral glume* wrinkled across.

(Tropical regions, New Mex. and south.) Common in North Patagonia.

8. CENCHRUS Linn. Bur-grass.

Leaves flat. *Inflorescence* spicate, the spikelets subtended by a spiny involucre which at length falls off with the seed as a spiny bur. *Glumes* 4, the third often enclosing a staminate, and the fourth being the flowering glume of the perfect flower.

Species 12, in warm countries.

C. TRIBULOIDES LINN.

Root annual. Involucres crowded on the scabrous rachis, 2-flowered, globose. Spines of burs stout. (N. Amer., Br. & Br. i, 127.)

N. Patagon.

9. LUZIOLA Juss.

Creeping water and marsh monœcious grasses with narrow leaves, and male and female 1-flowered *spikelets* in separate panicles, rarely in the same and then the male spikelets terminal. Rays of panicle filiform. *Stamens* exceeding 6 (to 18). Female flowers small. *Styles* 2, distinct. *Grain* elliptical, free from the pericarp.

Species 6, Brazil to Alabama; 1 in Patagonia.

L. SPRUCEANA Benth.

Culm glabrous, rooting at the nodes; the upper leaf-sheaths ventricose, striate; ligule long-acuminate; lamina linear, narrowly acuminate, ner-

vose, scabrous. Female panicle axillary, short-peduncled, rigid, its axis sulcate, angular, its branches crowded, strict, at length basi-refracted. Branchlets erect; no terminal spikelet. Male panicle patulous, after flowering contracted. Glumes pellucid.

(S. Brazil); Chubut, wet places.

10. ZIZANIOPSIS Döll and Ascherson.

Tall, aquatic, monœcious grasses with long flat leaves, and 1-flowered *spikelets* in panicles, the *female* terminating the branches, and the *males* below. Scales 2, subequal, the outer one in the female spikelet broad, acute, awned. Stamens 6. Styles united. *Grain* subglobose, separable from the pericarp, 3-ridged. (Fig. in Brit. & Br. i, 128.)

Temperate and tropical America. Species 2. (*Z. miliacea* in U. S. and Brazil.)

Z. BONARIENSIS (Bal.) Speg.

(Buenos Aires); N. Patagon., in wet places along Rio Colorado.

11. ANTHOXANTHUM Linn. Sweet-scented Vernal Grass.

Fragrant grasses with flat leaves and spike-like panicles. *Spikelets* 1-flowered, narrow, compressed. *Glumes* 5, the two lowest acute or short-awned, the lowest one the shortest; the third and fourth empty, hairy, 2-lobed and awned dorsally; the floral glume and palea small and obtuse. *Stamens* 2.

Species 5, European.

A. ODORATUM Linn.

Glumes 3 and 4 hairy, the third with an awn twice its length, inserted half-way up; the fourth with an awn inserted near the base and twice as long.

(Europe, naturalized in N. Amer., Brit. &. Br. i, 131.) Magellan (Dusén).

12. HIEROCHLOË Gmelin. (*Savastana* Schrank.)

Aromatic grasses with contracted or open panicles and flat *leaves*. *Spikelets* 3-flowered, the terminal flower perfect, the others staminate. *Glumes* 5, the 2 lower subequal, acute, glabrous, the next 2 shorter, obtuse or 2-lobed, each enclosing a palea and 3 *stamens;* the fifth often awned, enclosing a palea and a perfect 2-staminate flower.

Species 8, in temperate and cold regions. *H. borealis* Roem. & Schultes is the holy-grass of N. Eur. and N. Amer. (Brit. & Br. i, 131).

1. H. ARENARIA Steud.

Rhizome woody, somewhat creeping. *Culm* erect, 45–60 cm. high, sheathed the whole way; *sheaths* dilated; *leaf-blades* soon convolute, rigid, obtuse, glabrous. *Panicle* slightly diffuse, its rays solitary, few-flowered at top. *Spikelets* 6 mm. long, 3-flowered. *Glumes* slightly exceeding the flowers, those of the male flowers smooth marginally, ciliate, short, awned. *Perfect flower* obtuse, glabrous.

Magellan.

2. H. REDOLENS (Forst. sub *Holcus*) R. Br. (*H. antarctica* R. Br. *H. magellanica* Hook. f.)

Leaves plane below, convolute above, their sheaths lax-glabrous. *Panicle* effuse, nodding; pedicels pilose upwards. *Spikelets* 8 mm. long, the *male* flowers pilose on the margin and back; *perfect* flower short mucronate, glabrous.

Falklands, abounding near water; Magellan and through Fuegia to Cape Horn (also in S. Chili, Australia and New Zealand.)

H. REDOLENS MAGELLANICA (Hook. f.).

Panicle less elongate, and only slightly nodding.

Magellan.

H. REDOLENS MAJOR (Speg.).

Culms 2–3 meters, glabrous; ligules broadly triangular. *Panicle* very long, secund, nodding; upper rays close, lower remote.

Fuegia, by the coast; Blossom Bay; rare.

It would appear from Bentham's note in *Flora Austral.* vii, 558, that this species should be named *H. redolens* (Forster), as Forster's name (*Holcus redolens*) is the oldest and was applied to the typical New Zealand plant. It is *Melica magellanica* Desv. in Lam. Dic. iv, 72.

13. PHALARIS Linn.

Leaves flat; *panicle* spike-like or capitate. *Spikelets* crowded, 1-flowered. Empty *glumes* 4, first and second subequal, compressed, wing keeled; third and fourth small or rudimentary. Floriglume and palea equal. *Stamens* 3. *Styles* distinct. *Grain* oblong.

Species 10, most in S. Eur.; some in N. Amer.

P. ANGUSTA Nees.

Root fibrous. *Culm* (45–90 cm. high) and sheaths glabrous; the *sheaths* half as long as the internode. *Ligules* obtuse. *Leaves* glabrous, the upper 25 mm., the lower 7–10 cm. *Thyrse* 4–7 cm., linear. *Glumes* 3-nerved, subequally winged. Pedicels very short. Cartilaginous rudiments 2, pilose at apex, with pilose horn. *Flower* hermaphrodite, slightly shorter than the glumes, pilose.

S. Patagon., in meadows along Carren-leofú.

The Patagonia forms are stout, very green, with cylindraceous spikes, spikelets sometimes partly violascent. (Speg.)

14. ARISTIDA Linn. Three-awned grass.

Culms branching and *leaves* narrow, often involute-setaceous. *Panicle* spreading or contracted. *Spikelets* narrow, 1-flowered. *Glumes* 3, 1 and 2 carinate, third ridged and convolute, 3-awned (or the lateral awns obsolete). *Grain* free, enclosed in the glume.

Species 100, in warm countries. (Brit. & Br. i, 133.)

1. A. DIFFUSA Trin. & Rupr. (*A. laxa* Cav.)

Culms fasciculate, simple, 15–60 cm. tall. *Leaves* convolute, subulate, *sheaths* striate, glabrous. *Panicle* lax, depauperate, flexuose, its rays solitary, naked below, with spikelets above. *Glumes* fuscous, subequal, narrow, acuminate. *Flower* about 6 mm. long, apically twisted, lateral *awns* about thrice as long as the median.

Mexico, S. Amer. and Philippine Is. (In Patagon.?)

2. A. SETIFOLIA H. B. & K.

A tufted perennial about 60 cm. high. *Leaf-sheaths* short, lower *leaf-blades* numerous, narrow, involute. *Panicle* contracted, often included at the base. *Awns* of flowering glume diverging, mostly equal.

(Mexico and Brazil.) Probably in N. Patagon.

15. STIPA Linn. Feather-grass.

Tall, usually with convolute leaves which mostly persist around the fruit. Panicles with 1-flowered terete spikelets. Empty glumes 2, the floral

glume rigid convolute, having a hairy, often sharp, callus at its base, and a bent apical awn which is spirally twisted below and articulated. Stamens mostly 3. Grain free, closely surrounded by the glume. (Brit. & Br. i, 137; also Spegazzini, *Stipeæ platenses.*) (Fig. 31.)

Species 100, cosmopolitan.

The awn may be naked, or may have a *crown* around its base (Fig. 31, *A*), often surmounted by a *pappus* of villi or cilia (in section *Pappophora*), and there may be a *callus* beneath the grain (*A*, *C*). *S. capillata* (Engl. & Pr. Pflanzenf. II, 2, p. 46, fig. C–E) is the chief grass of the Russian steppes; its fruiting awn pierces the skin of sheep, sometimes killing them: similarly *S. spartea* Trin., the "porcupine-grass" of North America, and the grass of North Queensland which annoyed Captain Cook's seamen in 1770. In North Africa, *S. tenacissima*, called Esparto, Alfa, and "false horse-hair," is extensively exported, being used in southern Europe for plaiting into mats and chairs.

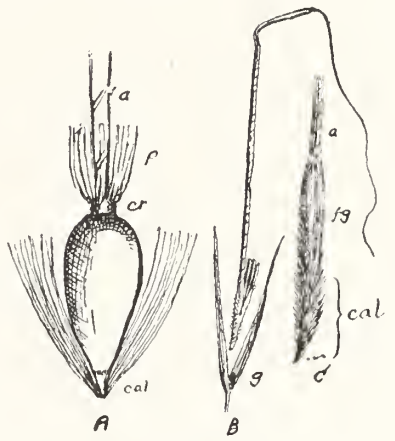


FIG. 31.

Stipa. cal, callus; *g*, empty glume; *fg*, floral glume; *cr*, crown; *p*, pappus; *a*, awn. *A*, *S. pampeana.* (After Spegazzini.) *B*, *C*, *S. capillata.* (After Hackel.)

KEY TO THE SPECIES.

A. Awn with long villi to the top. Lower glume exceeding 15 mm. long. Crown none. (*Pilostypa.*)

b. Lower glumella laxly hairy, not apically attenuate, 2-auricled. Awn 7 cm. long. Stamens 2. Culm rigid. Panicle sheathed, hairy. *pogonathera.*

b2. Lower glumella glabrous, long-attenuate upwards, or rostrate. Awn naked on lowest fifth part. Panicle subsecund, smooth. Culm 20 cm., slender, hairy. *neæi.*

A2. Awn with long villi only below its joint. (*Pappostipa.*) Panicle contracted.

b. Awn very long, with long pappus. Culm (35 cm.) and panicle sheathed. Leaves convolute to filiform, glabrous. *vaginata.*

b2. Awn with lower half nearly naked. Lower glume 1-nerved, upper 3-nerved. Lower glumella attenuate, not auricled. Culm 12 cm., slender, glabrous. Panicle sheathed. *humilis.*

b3. Awn more or less villous from base. Lower glumella scarcely attenuate, subtruncate, 2-auricled, pubescent. Lower glume 3-, upper 5-nerved.

c. Culm 30 cm. Leaves rushlike, pungent. Sheath-margins villous. Panicle short. Awn long-villous from base. *patagonica.*

c2. Culm 35 cm.; leaves short, scabrid. Panicle spike-like. Sheath-margins glabrous. Hairs of awn larger upwards. Glumella silky. *speciosa.*

*c*3. Culm 20 cm.; leaves shorter; nodes dark, smooth. Panicle depauperate. Awn 4-times as long as flower. *ameghinoi.*

*A*3. Awns naked or scabrous or pubescent.

b. Callus long, several times exceeding the floral diameter. Panicle spreading.

c. Crown very long and distinct from the glumella. (*Stephanostypa.*)

d. Flowers smooth, cylindraceous, attenuate upwards. Pedicels elongating after anthesis. *filiculmis.*

*d*2. Callus villous, shorter than the latterly cleft crown. Awn central, slender. Culm slender, 40 cm. *formicarum.*

*c*2. Crown short. Callus ring-like, strong.

d. Flowers rather large (12 mm.), very tetragonal. Glumes silky. Crown with acute lobed mouth. Awn thrice length of flower. Culm 75 cm., exceeding the glabrous leaves. *clarazi.*

*d*2. Flowers small, 5 mm., glabrous. Awn slender, 10 times as long. Culm 35 cm.; leaves setaceous. Panicle contracted. *tenuis.*

*c*3. Crown subconoid, scarcely constricted off. Flowers mediocre, obsoletely 4–6-angled. Callus short, strong. Culm 40 cm. Panicle nodding. *manicata.*

*c*4. Crown none. Flower long, pappose-villous above. Glumes half as long. Culm 30 cm. Panicle spreading. *papposa.*

*c*5. Crown small, constricted off. Flowers mediocre or small, not over 12 mm.

d. Crown appressed, ciliolate-fimbriate. Panicle nutant, depauperate. Culm 35 cm. *ligularis.*

*d*2. Crown silky. Awn excentric. Leaves setaceous. *pampeana.*

*d*3. Crown with truncate mouth, not appressed, nor laxly-ciliolate. Flowers 6–9 mm. *setigera.*

*b*2. Callus short, scarcely exceeding the floral diameter. Crown none or obsolete, not constricted off.

c. Lower glumella pubescent, pilose or villous. Panicle spike-like.

d. Glumes lanceolate, 3–5-nerved, violascent. Upper glumella as long as lower, hairy. Culm stout, 75 cm. *caudata.*

*d*2. Glumes narrowly linear, obsoletely 1–3-nerved. Callus villous. Culm slender; spike erect. *gynerioides.*

*c*2. Lower glumella glabrous to scabrid. Crown none.

d. Upper glumella as long as lower. Callus hairy. Panicle depauperate. Culms slender; leaves convolute, short. *rariflora.*

*d*2. Upper glumella not half as long as lower. Branching of mature panicle repeatedly trichotomous. Leaves setaceous. *trichotoma.*

1. S. AMEGHINOI Speg. (*Pappostipa*).

Glumes lanceolate, 2–3 times longer than the flower with pappus and joint, 3–5-nerved, greenish-hyaline. *Flower* spindle-shaped, villous, but dorsally glabrous in part; *callus* slightly exceeding the diameter of the flower, villous with a ventral foveola. Awn rigid, 4 times as long as the flower, pappose-villous. No crown. *Culms* simple, 10–25 cm., with

dark-colored, smooth nodes, often exceeding the convolute, glabrous *leaves*. *Panicle* contracted, with few spikelets, when young sheathed, at length naked.

Patagon., by Golfo de San Jorgo.

2. S. CAUDATA Trin.

Panicle contracted, its rays about 5, some of them floriferous not far above the base, others higher up. *Culms* stout, 40–90 cm. *Leaves* setaceous to rush-like. *Glumes* subequal, lanceolate, 5–6 mm. long, 3-nerved, generally one of them with an apical tail. *Floral-glume* exceeding 4 mm., pilose and with short apical setulæ. *Awn* persisting, flexuous or jointed at center, 12–16 mm. long, with a quasi-pappus at its base. Palea shorter, 2-nerved. *Anthers* very short, bearded.

Chili and near Bahia Blanca; a specimen from N. Patagon. "differs only in the awns being somewhat shorter." (J. Ball.)

3. S. CLARAZI Ball.

60–90 cm. tall with filiform radical and broad cauline *leaves* from inflated sheaths. *Panicles* lax, 25–50 mm. long. *Glumes* comparatively large, to 3 cm., the floral glume acuminate, its hairs silky, its *awn* 5–7 cm. long, scabrous, with a subcylindrical crown surrounded by a short ciliolate pappus. *Callus* villous, as long as 3–4 breadths of the flower, which is subtetragonal, villous on the angles.

N. Patagon., over all the pampas and hills.

4. S. FILICULMIS Del., 1894. (*S. ceresiensis* O. Ktze., 1898.)

Glumes linear-lanceolate, twice or more as long as the flower, hyaline, 3-nerved. Flower subfusoid, glabrous, or obsoletely rough. *Crown* none, but articulation of awn with glumella smooth or ciliolate. *Callus* 2–3 times as long as the floral diameter. *Awn* persisting, long, jointed in lower part. *Leaves* capillary-setaceous; *culms* 20–85 cm., at first shorter, afterwards longer, filiform. *Panicle* linear, depauperate.

Patagon., Argent., through all the pampas, from Chubut northwards.

5. S. FORMICARUM Del.

Cespitose, glabrous, perennial, 20–50 cm. high; culms leafy, erect, with thickish nodes. *Leaves* plane when fresh, about 25 cm. long, acute, not pungent. *Panicle* vaginate, relaxed, nutant. *Glumes* narrow-lanceolate,

surpassing the flower, 1–3-nerved, hyaline. *Flower* sublanceolate, subglabrous; *crown* largish, ciliate-edged. *Callus* villous. *Awn* persistent, 7 times as long as the flower.

N. Patagon., by Rio Colorado, near Fort Mercedes.

6. S. GYNERIOIDES Phil.

Glumes narrow-linear, twice as long as the flower, exceeding the pappus, 1–3-nerved, subhyaline. *Flower* fusoid, pubescent, apically crowned with pappus-villi of its own length. *Callus* half as long as the floral diameter, villous. Awn subpersistent, 3–5 lengths of the flower. *Culms* 25–90 cm., about equalling the setaceous, scabrid *leaves*. *Panicle* narrow, scarcely secund.

N. Patagon., Argent., over all the pampas by Rio Negro, and on the hills.

7. S. HUMILIS Vahl.

Root fibrous. *Culm* cespitose, 10–15 cm. high, slender, glabrous. Upper sheath ventricose, sheathing the short, spicate (25 mm.) *panicle*. Rays short, glabrous. *Glumes* acute, one third longer than the 4–6 mm. flower. *Awn* nude and straight at base, above with white hairs, feathery to their joint, thereafter nude and straight again.

S. Patagon., by R. Sta. Cruz.

S. HUMULIS INTERMEDIA O. Ktze.

Awn with a few hairs on the lower third. Leaves straight.

Patagon.

S. HUMILIS DECRESCENS O. Ktze.

Awn with many short hairs at its base. A pilose and also a subglabrous form.

(Argentina); Patagon.

8. S. (PAPPOPHORA) IBARI Phil.

Densely cespitose and rigid, with pilose convolute-setaceous *leaves*. *Culm* twice as high as the radical leaves, involucrate to the panicle. Nodes white-woolly with deflexed hairs. *Glumes* 17 mm. long, subequal; the flower without hairs at its base. *Floral glume* 7 mm. long, pilose, awn 25 mm. long and long-pilose below its angle.

At Lake Pinto, S. Patagon.

9. S. LIGULARIS (Griseb.) Speg. (*S. neesiana* Trin. v. *ligularis* Gris.)

Glumes long-lanceolate, twice as long as the flower, 3-nerved, violascent. *Flower* subterete, pallid, minutely papillose. *Crown* cup-like, short, with an oblique ciliolate pappus. *Callus* 3–4 times longer than the flower, white-villous. *Awn* persistent, 8–9 times longer than the flower; jointed midway, and at the upper third. *Culms* 25–50 cm., much exceeding the smooth, plane to subconvolute *leaves;* nodes pubescent. *Panicle* rather depauperate, lax, nutant.

(Brazil; Bolivia-Argentina); Patagon.

10. S. MANICATA Desv. 1853. (*S. latissimifolia* O. Ktze.)

Glumes elliptic-lanceolate, often twice as long as the flower, green hyaline, to dark-violet. *Flower* obsoletely 4–5-gonal, villous at the angles. *Crown* cylindric with short cilia. *Callus* just exceeding the diameter of the flower, villous. *Awn* persisting, 7–10 times as long as the flower, jointed below the upper third, and below the middle, subpubescent. *Culms* exceeding the flat, broad, scabrid leaves. *Panicle* mostly profuse, lax, nutant.

(Pampas of Montevideo; Chili); N. Patagon., in meadows and rocky regions.

S. MANICATA MEDIA Speg.

Culms 35–90 cm. *Leaves* usually plane, 4–7 mm. broad, glabrous or hirtellous, dull green. *Panicles* dense, nutant; *glumes* dark-purplish. *Flowers* mediocre, tetragonal.

Patagon., in mountains of Nahual-huapi.

S. MANICATA TYPICA Speg.

Culms 15–40 cm. *Leaves* mostly laxly involute, glabrous, 4–5 mm. broad; they and the sheaths ciliate on margin, green to glaucescent. *Panicle* large, erect or secund. *Glumes* greenish to smoky-purplish. *Flowers* terete-subpentagonal.

Patagon., near Teka-choique, and Carren-leofú.

11. S. NEÆI Nees.

Culm slender, with many nodes, pubescent, hairy below the joints, simple, 15–30 cm. *Leaves* convolute-setaceous, glabrous, dorsally smooth. *Ligule* pilose, lacerous. *Panicle* racemose, contracted, sub-

secund, smooth. *Glumes* from a colored base, membranaceous-hyaline, setaceous-attenuate, exceeding the short-stiped, lanceolate flower. *Awn* 10 times as long as the flower, slightly twisted at the base, pilose upwards.

(Argentina); Patagon., by Rio Sta. Cruz, and Rio Chubut.

12. S. PAMPEANA Speg.

Glumellæ elliptic-lanceolate, 2–3 times longer than the flower, 3-nerved, dark-purple. *Flower* oblanceolate or obovate, compressed, smooth and shining; on a callus which is rather long, and with long white villi surmounting the flower. *Crown* small, subturbinate, with white villi. *Awn* persistent, 10 times as long as the flower. *Culms* 25–45 cm., slender, sometimes surpassing the smooth subulate-setaceous *leaves*. *Panicle* spicate, depauperate.

(S. Argentina); Patagon., Chubut, by Teka-choique. (Fig. 31, *A*).

13. S. PAPPOSA Nees. 1849. (*S. jarava* Beauv.)

Glumes very narrow, small, about half as long as the flower, 1-nerved, hyaline. *Flower* linear-lanceolate, smooth, rough upwards, abruptly crowned by villi of its own length. *Callus* 2–3 times as long as the flower is broad, white-villous. *Awn* persistent, 3–5 times as long as the flower. *Culms* simple, surpassing the smooth convolute-plane leaves. *Panicle* diffuse, erect or nutant.

N. Patagon., over the pampas from Rio Negro northwards through Argentina. (Mex.)

14. S. PATAGONICA Speg.

Perennial, densely cespitose, 20–35 cm. high. *Caudex* often bearing apical innovations. *Culm* fasciculately leafy, longer than the leaves. *Leaves* convolute, terete-juncoid, rigid, acute-pungent, glabrous. *Sheaths* glabrous, close-appressed, their margin ciliate-pectinate. *Ligules* narrow-velvety; a villous ring on outside at base of lamina. *Panicle* short, contracted. *Spikelets* pediceled; glumes hyaline, subequal, glabrous, twice exceeding the appressed, silky floral glume, which is acutely callus-pediceled. *Awn* geniculate, twice as long as its glume, white-villous below the joint.

S. Patagon., by Rivers Gallegos and Sta. Cruz.

15. S. POGONATHERA Desv. (*S. pulchella* Munro.)

Culm terete, rigid, whitish-pubescent, with glabrous nodes. *Leaves* terete-convolute, hairy inside. *Ligule* oblong, pilose. *Panicle* 15–30 cm. long, sheathed at base, plumose-whitish. Empty *glumes* 3-nerved, narrow, acuminate, the lower larger and twice as long as the flower. *Floral glume* 8–9 mm. long, with awn 7 cm. long, bearded, recurved. *Palea* pilose outside. *Anthers* 2.

(Chili); S. Patagon.

16. S. RARIFLORA (Hook. f. sub *Muhlenbergia*) Benth.

Rigid, glabrous, 10–15 cm. high. *Culm* leafy; leaves much shorter than culm, rigid, setaceous with involute margins. *Panicle* effuse, with about 10 spikelets. *Glumes* subequal, nerveless, shorter than the flower. *Floral glume* lanceolate, coriaceous, glabrous at base, violascent, ending in a very long, rigid, rough *awn*, which embraces the short palea; rachilla bearded. Stamens 3. *Ovary* stiped, contracted above the middle.

(S. Chili, Cape Tres Montes); W. Patagon.; Fuegia.

Closely allied to *S. verticillata* from Australia and to *Apera arundinacea* from New Zealand. (Benth.)

17. S. SETIGERA Presl. (1836, non auct. Am. bor.). (*S. neesiana* O. Ktze. non Trin.)

Glumes long-lanceolate, twice as long as the flower, 3–5-nerved, hyaline or violascent. *Flower* terete, pale or fuscous, smooth, minutely papillose. *Crown* obconical or cup-like, nude or ciliolate, constricted at base. *Callus* 2–3 times exceeding the floral diameter, villous. *Awn* persistent, 7–8 times as long as the flower, jointed near the middle, lower part twisted. *Culms* 10–50 cm., surpassing the convolute-plane, partly hirtellous *leaves*, retrorsely hirsute at the nodes. *Panicle* mostly depauperate, and lax-nutant.

N. Patagon., pampas about Rio Negro and northwards in Argentina.

18. S. SPECIOSA Trin. & Rupr. (*S. chrysophylla* Desv. *S. humilis speciosa* O. Ktze.)

Culms erect, tufted, 20–50 cm. high. *Sheaths* tawny, shorter than the internodes; the upper one inflated. Lower ligule minute, fringed, the upper 2 mm. long. Leaves of sterile shoots erect, scabrid, short; *leaves* of

culm 3, involute. *Panicle* spike-like, 6–20 cm. long; rays in pairs bearing 1–3 spikelets. Empty glumes subequal, hyaline, acuminate, 16 mm. long, 3 and 5–7-nerved. *Flowering glume* silky, 5-nerved, 8–12 mm. long, with short callus and 2-toothed hairy apex; its *awn* 3–4 cm., geniculate, twisted, plumose, with many long hairs at its base.

(Argentina); S. Patagon. (Dusén).

19. S. TENUIS Phil. 1870. (*S. argentina* Speg. 1896. *S. neesiana* O. Ktze. 1896, non Trin.)

Glumes linear-lanceolate, 2–3 times longer than the flower, 1–3-nerved, hyaline to violascent. *Flowers* subfusoid, terete, smooth. *Crown* small, turbinate, with a ciliolate circle. Callus 2–3 times as long as the floral diameter, white-villous. *Awn* persistent, slender, 8–12 times longer than the flower, jointed about the lowest fourth, scarcely pubescent. *Culms* 15–45 cm., much exceeding the setaceous or rush-like rough *leaves*. *Panicle* narrow, depauperate.

N. Patagon. in dry and mountain plains by Rio Negro, and northwards in Argentina (also in California).

20. S. TENUISSIMA Trin. (*S. mendocina* Ph.; *S. oreophila* Speg.)

Glumes lanceolate, 3–4 times longer than the flower, 3-nerved, hyaline, tending to violet. *Flower* long, small, dorsally subgibbous, laterally compressed, glabrous, very delicately rough. Callus as long as the flower is broad, villous, acute. *Crown* small, boss-like, ciliolate. *Awn* persistent, very slender, 25 times as long as the flower. *Culms* 30–50 cm., little exceeding the capillary-setaceous, scabrid *leaves*. *Panicle* vaginate, contracted.

(Argentina); N. Patagon., by Rio Negro, on dry sandy plains and dunes.

21. S. TRICHOTOMA Nees. (Hack. sub *Nasella*).

Glumes ovate-lanceolate, 3–4 times as long as the flower, 3-nerved, purplish. *Flower* obovate, dorsally gibbous, glabrous to slightly rough. *Crown* none. *Callus* very short, white-villous. *Awn* persistent, 8–15 times as long as the flower. *Culms* slender, 15–50 cm., at first as long as the scabrid setaceous *leaves;* the uppermost internode at length elongating produces a large lax *panicle* with trichotomous rays.

(Argentina, etc.); N. Patagon., over pampas, by Rio Negro.

22. S. VAGINATA Phil.

(Pappophora.) *Glumes* violaceous-green, with hyaline borders, subequal, 14 mm. long. Callus glabrous. *Floral glume* 16 mm. long, white pilose; palea little shorter, glabrous. *Awn* 26–30 mm. long, with long white basal pappus. Plants cespitose, with rigid glabrous *culms* enclosed in the leaf sheaths; *laminæ* convolute, filiform, glabrous, smooth. *Panicle* long, contracted, ensheathed.

Allied to *S. speciosa.*

(Chili, near Aconcagua); Patagon., Chubut, near Cabo Raso; "these differ from the description by having the *awns* villous as far as the joint, and by the floral glume 6, not 16 mm. long." (Speg.)

16. ORYZOPSIS Mich.

Stipeæ. Cespitose grasses, sometimes tall, leaves plane or convolute. *Panicle* terminal, lax, narrow or effuse. *Spikelets* 1-flowered, rachilla jointed above the lower glumes, callose under the flower, not produced above the flower, which is hermaphrodite and terminal. *Glumes* 3, the 2 lower, below the articulation, persistent, subequal, empty. The *floriglume* broad, enclosing the flower and the 2-carinate *palea*, apically obtuse or truncate, its terminal *awn* often excentric, geniculate, and twisted below; it and its awn very caducous. *Stamens* 3. *Grain* oblong, enclosed in the glume, free.

Differs from *Stipa* by its broad floriglume, often oblique.

Species 24, in north temperate regions of both hemispheres and S. Amer.

O. NAPOSTAËNSIS Speg.

Glumes mediocre, lanceolate, twice as long as the flower, 3–5-nerved, violascent. Flower cylindraceous, chestnut to umber-hued. Crown annulate-cupuliform, short; pappus velvet-ciliolate. Anthopodium (*callus*) 4 times diameter of flower, rufous-villous. Awn 6–9 times as long as the flower, jointed below the middle, and at lowest fourth, persisting. Leaves capillary-setaceous, smooth. Panicle depauperate, nutant.

(Buenos Aires); N. Patagon., dry meadows near Carmen.

O. NAPOSTAËNSIS BRACHYSPERMA Speg.

Small, contracted, cespitose. Leaves setaceous, short, 25–50 mm., often somewhat circinate. Glumes small. Awns thickish, the upper

joint much below the middle. Anthopodium scarcely half the length of the flower.

N. Patagon., at Pantanosa near Carmen.

O. TUBERCULATA (Desv. sub *Piptochætium*) Speg.

Glumes ovate, exceeding the flower, 5–3-nerved; sometimes violascent. Flower hazel-colored to black, sublenticular, carinate, papillose-verrucose. Crown none or scarcely umboniform. Anthopodium small, short-pubescent. Awn excentric, caducous, 4–5 times as long as the flower. Culms equalling or even exceeding the filiform subglabrous leaves. Panicle contracted-spiciform, often sheathed.

N. Patagon., in dry sandy places near Carmen.

FIG. 32.

Muhlenbergia rariflora. Inflorescence and one spikelet enlarged. (From *Flora antarctica*.)

17. MUHLENBERGIA Schreber.

Leaves flat or convolute; *panicle* strict or lax. *Spikelets* 1- rarely 2-flowered. *Glumes* 3–4, the empty glumes acute or awned, the flowering glume 3–5-nerved, obtuse or acute or long-awned; at length enclosing the free grain.

Species 60, chiefly American, a few Asiatic. (Brit. & Br. i, 142.)

M. RARIFLORA Hook. f. (*Stipa rariflora* Benth.)

Rigid, glabrous; the *culm* leafly, the *leaves* setaceous, with involute margins. *Panicle* lax, few to 10-flowered. Spikelets purplish. *Glumes* subequal, nerveless, slightly shorter than the flower. *Floral glume* lanceolate, coriaceous, glabrous at the base, ending in a very long rigid scabrous *awn*, and embracing the shorter *palea*. (Fig. 32.)

W. Patagon., Cape Tres Montes; Staaten I.; Fuegia; W. Magellan (Dusén).

18. PHLEUM Linn. Timothy-grass.

Leaves flat. *Panicle* spike-like, cylindrical or ovoid. *Spikelets* 1-flowered. *Glumes* 3, 1 and 2 subequal, keeled and mucronate or awn-tipped.

Floral glume shorter truncate hyaline, enclosing the narrower hyaline palea and flower.

Species 10, in temperate and cold regions.

1. PH. ALPINUM Linn. Mountain-timothy.

15–45 cm. tall. Upper *leaf-sheaths* inflated, the uppermost leaf only 25 mm. long. *Spikes* short, ovoid-oblong, purplish, the *awns* of their upper spikelets long and projecting.

(By Andes from N. parts of N. Amer. and from Eur.) Cobo Negro, S. Patagon. (J. B. Hatcher); throughout Fuegia (Dusén).

2. PH. PRATENSE Linn.

Tall. *Spike* long-cylindrical. Lower *glumes* dorsally ciliate, tipped with a short *bristle*.

(Eurasia and N. Amer., much cult.); Patagon.

19. ALOPECURUS Linn. Foxtail.

Panicle densely spicate; the *spikelets* 1-flowered, jointed on the very short pedicel, 2–6 mm. long, subcompressed. *Glumes* 3, 2 of these empty, acute, not awned; the third obtuse, awned on the back, subtending a *palea* and a perfect flower. (Palea often wanting.)

Species 20, chiefly in north temperate regions.

1. A. ALPINUS Smith.

Culm nearly smooth, erect, 30 cm. tall. *Leaf-sheaths* shorter than the internodes, loose; the *leaf-blades* 2–6 mm. wide, slightly scabrous above. *Spike* ovoid, 4 cm. long, 6–12 mm. thick. *Lower glumes* 4 mm. long, united at base, villous. *Floral glume* as long, with *awn* one third way up. Varies much in size, villosity and in length of awns. (Brit. & Br. i, 149.)

(Arctic and alpine regions; also in Scotland.) Patagonia passim; Falklands; Magellan; Fuegia to Cape Horn. A form at Ushuaia has the floral glumes blue.

2. A. ANTARCTICUS Vahl.

Culm erect, 30 cm. tall, glabrous. *Leaves* narrow, linear-subulate, plane, 5–7 cm. long. *Spike* ovate to 7 cm. long. *Glumes* purplish at apex; *flowering glume* shorter, awned towards base, the awn long. (Fig. 33.)

Magellan; Patagon., Rio Chubut (Dusén).

3. A. GENICULATUS Linn. (*A. aristulatus* Mich.)

Culm smooth, erect, 25 cm. tall. *Sheaths* loose, shorter than the internodes; *leaf-blades* 1–4 mm. wide, scabrous. *Spike* ovoid-cylindrical. *Empty glumes* over 2 mm. long, united only at the base, the keels ciliated. *Floral glume* shorter, obtuse, dorsally awned at its lower quarter, the awns protruding. (Eurasia and N. Amer.; Australia.)

N. Patagon., in valley of Rio Negro and elsewhere; by Rio Gallegos (Barnum Brown). "Gramilla de bañado."

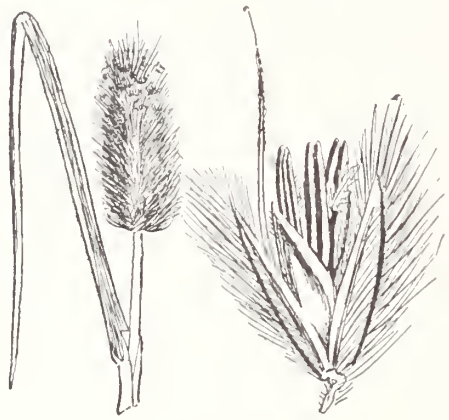


FIG. 33.

Alopecurus antarcticus. Spike, slightly reduced; and magnified spikelet.

4. A. LECHLERI Steud. (*A. magellanica* Lam. *A. alpinus aristatus* Hook. f.)

Culm erect, terete, over 1 m.tall. *Leaf-sheaths* long, glabrous, the *blades* narrow, semi-convolute, acuminate, smooth. *Spike* ovate-oblong, dense. *Glumes* subconnate at base, villous, 3-nerved, equalling the flowers. *Awn* scarcely exceeding the glumes.

Valdivia.

20. SPOROBOLUS R. Br.

Leaves flat or convolute, the throat usually bearded, often sheathing the open or contracted *panicle*. *Spikelets* small, 1- (or 2–3-) flowered. *Glumes* 3, awnless and usually pointless; the first shorter, the floral glume equalling or exceeding the others. *Stamens* 3, occasionally 2; *grain* early deciduous, often thin with the loose seed.

Species 80, many American.

1. S. ARUNDINACEUS Gray (non Vasey). (*Diachyrium.*)

Culm 60–90 cm. tall, smooth, compressed-cylindrical, densely enclosed at base in 10 mm. broad sheaths, leafless above. *Leaves* as long as the culm, cylindrical, pungent, the sheaths being long, woolly-margined: the lower sheaths bladeless. *Panicle* 25 cm. long, 3–4 cm. broad, attenuate both ways. *Pedicels* thick at top, same length as the spikelets. *Empty glumes* lanceolate, acuminate, carinate, longer (5–6 mm.) than the flowering glume and palea.

(Catamarca); N. Patagon. S. Patagon, by Rio Chico.

2. S. INDICUS R. Br.

Stout, erect, glabrous, 3–12 dm. tall, tufted. *Leaves* long, attenuate to a slender point; their *ligules* a ring of short hairs. *Glumes* 1 and 2 unequal, half as long as the floral glume.

(N. and S. Amer., Brit. & Br., i, 154.) N. Patagon.

21. POLYPOGON Desf. Beard-grass.

Mostly decumbent annuals with flat *leaves* and usually spike-like *panicles*. *Spikelets* 1-flowered; *glumes* 3, all awned; nos. 1 and 2 empty, no. 3 smaller and subtending a shorter palea and its flower. *Stamens* 1–3. *Grain* free, enclosed in the glume and palea.

Species 10, extra-tropical. (Brit. & Br. i, 157.)

1. P. CHONOTICUS Hook. f.

Panicle large, oblong; its branches smooth but its pedicels rough. *Leaves* shorter than their sheaths. *Glumes* pubescent, obliquely truncate with *awns* twice as long as the flowering glume, which is 5-nerved and 5-awned.

Chonos Archip. and Cape Tres Montes.

2. P. ELONGATUS H. B. & K. (*P. littoralis* Smith.)

Culm simple, nodes glabrous. *Leaves* rough-margined. *Panicle* narrow, 10–30 cm. long, heads if larger nodding. *Rays* numerous, slender. *Spikelets* 2.5 mm. long. *Glumes* hispid at the nerve, aculeate to a seta. Floral glume half as long, bearing a seta. *Palea* shorter.

Eurasia; S. Amer.

3. P. ELONGATUS PATAGONICUS Speg.

Panicle more lax than in the type, subinterrupted, purpurascent, more or less sheathed by the upper leaf. *Ligule* short, toothed. *Awn* thrice as long as its glume.

S. Patagon., by R. Sta. Cruz; Chubut.

4. P. MONSPELIENSIS Desf.

Panicle densely spike-like. *Glumes* 2 mm. long, obtuse, bifid, scabrous. *Flowering glume* shortly erose-truncate. (In tropics and temperate parts of both hemispheres.)

N. Patagon. "Very common about Bahia Blanca in the valley of Rio Negro and elsewhere in N. Patagonia." (J. Ball.)

22. AGROSTIS Linn. Bent-grass.

Panicles effuse, of very many 1-flowered spikelets. *Glumes* 3, two empty, keeled, acute; the third or floral glume is shorter, obtuse, often dorsally awned. *Palea* short or wanting. *Grain* free, enclosed in the glume. *Seed* adhering to the pericarp.

Species 100, cosmopolitan, chiefly in temperate climates.

Key to the Species.

A. Floral glumes awned.
- *b.* Leaves glabrous.
  - *c.* Panicle lax.
    - *d.* Cespitose. Culm 30 cm., naked. Leaves filiform, short. Spikelets minute. Awn short, caducous. Palea none (?). *kufuim.*
    - *d*2. Panicle nodding or inclined, its rays rough, culm erect, cespitose. Floriglume 4-toothed.
      - *e.* Culm 50 cm. Leaves long, linear-lanceolate. Glume 4 mm. long, 3 times as long as its flower. *magellanica.*
      - *e*2. Culm 5–60 cm. Leaves flat. Panicle dense. Floriglume exceeded by its awn. *antarctica.*
    - *d*3. Panicle ovate, its branches forking. Leaves involute. Glumes unequal. Floriglume broad-ovate. *airoides.*
    - *d*4. Panicle green-violet. Empty glumes 3 times as long as the truncate floriglume. Awn long, straight. Culms 18 cm., sheathed. *rinihuensis.*
  - *c*2. Panicle contracted. Culm 27 cm., sheathed. Leaves flat. Glumes violet; floriglume half as long as empty glumes; awn protruding. *vaginata.*
- *b*2. Leaves smooth, but with rough edges. Glumes subequal; floriglume smaller.
  - *c.* Panicle contracted, rays 1-spiculate. Culm 18 cm., sheathed. Palea as long as the bifid floriglume. *lechleri.*
  - *c*2. Panicle lax. Cespitose; culms 50 cm., nodeless upwards. Palea shorter than the obtuse floriglume. *paucinodis.*
  - *c*3. Panicle lax, lucidulous. Culms 45 cm., scabrous upwards. *exasperata.*
- *b*3. Leaves plane, smooth, but upper surface rather rough. Culms 35 cm., smooth, naked; rootstock creeping. Spikelets minute; palea none; floriglume enclosing grain, often awnless. *pyrogea.*
- *b*4. Leaves pubescent or scabrous.
  - *c.* Culms smooth.
    - *d.* Panicle lax.
      - *e.* Panicle straw-purple, oblong. Culms 35 cm., with leafy offsets. Leaves setaceous, pungent. A floral rudiment. *nardiflora.*
      - *e*2. Panicle dense, cernuous, many-rayed. Culm 75 cm., leaf-sheaths glabrous. Awn terminal, short. *patagonica.*

*e*3. Culm 70 cm. Leaves convolute-filiform. Glumes 6 mm., purplish. Awn long. *antoniana.*

*d*2. Panicle contracted. Culms 50 cm.

e. Awn long. Spikelets large. Glumes slightly exceeding the flowers. *brachyathera.*

*e*2. Awn short. Spikelets small. Glumes 4 times as long as the flowers. *macranthera.*

*e*3. Awn bent. Spikelets only 1 mm. long. Floriglume obtuse. Leaves 5 cm. long, plane. *canina.*

*c*2. Culm rough, 60 cm., from a creeping rootstock. Leaves linear-lanceolate, retrorsely scabrid. Awn long. Palea none. *cognata.*

*A*2. Mostly awnless, sometimes with awns.

b. Pubescent. Panicle spreading, erect; spikelets violaceous. Culm jointed at base, glabrous. Leaves convolute or subsetaceous, with auricles for ligules. *aberrans.*

*b*2. Scabrous.

c. Culm 30 cm., glabrous. Panicle exserted, green to purplish-brown, at length contracting. Leaves flat, with long ligules. *alba.*

*c*2. Culm 40 cm. Panicle dense, exserted.

d. Leaves flat, or involute. Empty glumes subequal. Floriglume truncate, toothed. *exarata.*

*d*2. Leaves subsetaceous. Floriglume 4-toothed. Palea shorter or none. *tenuifolia.*

*b*3. Smooth, varying. Leaves narrow, acute. Panicle strict; its rays di- to trichotomous. *moyanoi.*

*A*3. Acute-awned. All glabrous. Lower 3–4 nodes sheathed. Leaves shortish, plane. Panicle spike-like, erect; rays densely spiculiferous. *tehuelcha.*

*A*4. Awnless.

b. Annual. Culm 30 cm., nodeless above. Sheaths rough. Panicle lax, its rays opposite. Glumes straw-colored. *serranoi.*

*b*2. Glabrous perennials.

c. Panicle lax.

d. Panicle naked below. Glumes 3 mm., yellowish-violet; floriglume slightly shorter. *fuegiana.*

*d*2. Culm 65 cm., naked above. Rays in 2's. Glumes 4 mm., floriglumes half as long. *oligoclada.*

*d*3. Culm 30 cm., from a creeping base, branching, sheathed. Leaves distichous, short. Floriglume as long as empty glumes. *distichophylla.*

*c*2. Panicle contracted. Spikelets small.

d. Erect, culms 20 cm. Spikelets straw-colored. Glumes subequal, exceeding the flower; floriglume 3-toothed. *flavidula.*

*d*2. Creeping; culm 9 cm., stoloniferous. Leaves flat. Floriglume truncate, nerveless. *prostrata.*

*c*3. Panicle slightly contracted, spikelets small. Keel of glumes rough, acute-awned. Culm sheathed half-way. Leaves plane, shortish. Rays spiculiferous from the base. *sanctacruzensis.*

*b*3. Scabrous and strict. Panicle contracted, glabrous. Rays in umbellate verticils. *umbellata.*

1. A. ABERRANS Steud.

Culms 1-jointed at base, then erect, glabrous. *Leaf-sheaths* long, striate, pubescent, with hyaline, obtuse auricles for ligules. *Leaves* narrow, convolute or subsetaceous, much shorter than the culms. *Panicle* erect, spreading, the rays 4–7-whorled; subrays few-flowered. *Spikelets* lance-linear, acute, violaceous. *Floral glumes* subequal, acute, glabrous, mostly awnless.

Magellan.

FIG. 34.

Agrostis airoides. Plant, in center; natural size; young and open spikelets, and floral glume with palea. (After Franchet.)

2. A. AIROIDES Franchet.

Cespitose, with many sterile fascicles. *Culms* sulcate, smooth. *Leaves* all involute, 2–3 on the culm, with short blades. *Panicle* ovate, the branches dichotomizing; the pedicels capillary, scabrid, spreading, 4–7 times as long as the flower. *Glumes* unequal, the lower slightly longer, the flowering glume hyaline, broad-ovate, truncate or toothed, awnless.

Magellan, Punta Arenas; Fuegia, Elizabeth I., remarkable for rush-like, rigid, pungent leaves. (C. Speg.)

A. AIROIDES FLACCIDIFOLIA Speg.

"Differing from the species by having leaves convolute, flaccidulous, and smaller spikelets (1.5–1.75 mm. long); from *A. leptotricha* Desv. by smaller *spikelets*, and *floriglume* smooth, always solitary; from *A. moyanoi* Speg. by smooth *floriglume* and *panicle* rays shorter and more rigid." (Speg.)

3. A. ALBA Linn. Red-top.

Culms to 30 cm. tall, glabrous. *Sheaths* shorter than the internodes; ligules to 8 mm. long; *leaf-blades* 2–6 mm. broad, scabrous. *Panicle* at first open, becoming contracted, green-purple or brown; the palea con-

spicuous, at least one third as long as the rather short truncate floral glume. (Fig. in Brit. & Br. i, 159.)

(Eur. and cult. in N. Amer.) Falklands, perhaps introduced.

4. A. ANTARCTICA Hook. f.

Erect, cespitose, 5–60 cm. tall, nodding or inclined, somewhat dense-flowered and with whorled branches and scabrid pedicels. *Glumes* equal, scabrid on the keel, twice as long as the flower, which is glabrate at base. *Floral glume* truncate, 4-cuspidate, 5-nerved with an *awn*, exceeding the glumes. Palea small. Scales oblong, scimeter-shaped, subacute (Fig. 35).

Swampy land, abundant and elegant. Chonos and Fuegia to Cape Horn; Churucca; Falklands [Kerguelen I.]. (Possibly a var. of *A. magellanica.*)

FIG. 35.

Agrostis antarctica. Inflorescence and spikelet with awn. (*Flora antarctica.*)

5. A. ANTONIANA Gris.

Culm 45–90 cm. tall, smooth. *Leaves* convolute-filiform, rough, often 30 cm. long, strict; ligule long. *Empty glumes* 6 mm. long, slightly exceeding the flower, purplish dorsally; *awn* rather long. *Floral glume* 4-toothed.

Near *Calamagrostis*, but distinct by the sterile glumes being broader, acutish, awned dorsally below the middle.

(Andes of Peru; Argentina); Patagonia (?).

6. A. BRACHYATHERA Steud.

Culm erect, strict, smooth, 50 cm. tall. *Leaves* very narrow, acute, scabrid, 6 cm. by 1 mm.; ligule hyaline, oblong. *Panicle* contracted; *rays* in semiwhorls of 4–6, unequal, dividing into few-spiculate raylets. *Spikelets* small, to 2 mm. long; *glumes* keeled, rough, exceeding the flowers; floral glume usually awned, the *awns* not exceeding the glumes.

Magellan; Fuegia.

A yellowish specimen represents the typical form, the floral glume awned; a violet specimen represents the muticous form.

7. A. CANINA Linn. Brown Bent-grass.

Culms erect, 50 cm. tall, slender, glabrous. *Leaves* 3–7 cm. long, 2 mm. wide, scabrous. *Panicle* contracted, the branches slender, naked below. *Spikelets* 1 mm. long on appressed pedicels, the *floral glume* two thirds as long as the others, obtuse, smooth, with a somewhat bent dorsal awn. (Eur. and N. Amer. with varieties.)

Punta Arenas; Beagle Channel; Brecknock Pass. (Fig. in Brit. & Br. i, 160.)

A. CANINA FALKLANDICA Hook. f.

Radical *leaves* filiform, shorter than the slender *culm*. *Glumes* equal, ovate-lanceolate, acuminate, scabrid on the keel, exceeding the flowers; floral glume erose-truncate, its *awn* short or none; palea wanting.

Magellan; Falklands. "A specimen of *A. canina* from Punta Arenas by Dr. Sabatier has some of the leaves setaceous-involute, and others flat-linear; the former is like *A. Falklandica*." (Franchet.)

8. A. COGNATA Steud.

Rhizome creeping. *Culms* erect, about 60 cm. tall, striate, rough below the panicle; ligules exserted, hyaline; *leaf-blades* linear-lanceolate, acute, retrorsely scabrid, 12 cm. long. *Panicle* oblong, lax, flexuose, slightly nodding; rays capillary, rough, floriferous nearly from base. *Spikelets* lanceolate, 3 mm. long; *glumes* subequal, violaceous and green, the keel spiny-scabrid, twice as long as the flower; floral-glume bifid with a dorsal jointed *awn* exceeding by half the empty glumes; palea none.

9. A. DELFINI Phil.

Panicle about 20 cm. long, with 5 branches in semi-whorls. Pedicels 1–2 times as long as the 2 mm. spikelets. *Glumes* green, smooth; floral glume three fourths as long as the others; *awn* as long as the glume.

W. Patagon.; by Rio Palena, W. of the Cordilleras.

10. A. EREMOPHILA Speg. (*A. distichophylla* Phil. non R. & S.)

Creeping (?), branching at base, glaucous, glabrous. *Culms* 30 cm. tall, both sterile and fertile enclosed in leaf-sheaths. *Leaves* crowded, distichous, short; the ligules very short. *Panicle* large, pyramidal, 12 cm. long; *glumes* equal, lanceolate; floral glume as long, acuminate; palea nearly as long; these glabrous.

(Atacama); N. Patagon., in dry stony places near Colu-huapi. "Glumes always conspicuously shorter than the flower." (Speg.)

11. A. EXARATA Trin.

Culms erect, 30–60 cm. tall. *Leaves* mostly erect. *Panicle* narrow, crowded, greenish, the rays floriferous from the base; spikelets 3–4 mm. long; *glumes* subequal, acute, the floral glume shorter, sometimes awned above the middle; palea shorter or none.

(W. of N. Am., Brit. & Br. i, 160.)

A. EXARATA ANGUSTIFOLIA Hackel.

Leaves of innovations very narrow, scarcely 1 mm. broad; often convolute; those of the culm broader. *Culm* 15 cm. tall.

East Fuegia (Dusén).

12. A. EXASPERATA Trin.

Culm simple, 45 cm.?, scabrous upwards; nodes and sheaths glabrous; ligule sublinear, obtuse. *Leaves* plane, 5–10 cm. long, 2–3 mm. broad, roughish on edge. *Panicles* spreading, 7–10 cm., lucidulous, with several semi-whorls of rays, the shorter floriferous from the base, the longer upwards. *Spikelets* pallidly virescent. *Glumes* subequal, linear, hispidulous. *Floriglume* half as long as the empty glumes, glabrous, with shortly denticulate apex, bearing an erect *seta* which exceeds the glume. *Palea* one third as large. Callus hairless; rudiment none.

(Chili); Patagon., elevated meadows near Carren-leofú.

13. A. FLAVIDULA Steud.

Culms erect, 20 cm. tall; *leaf-sheaths* striate; ligules exserted, hyaline. *Panicle* contracted, 5–7 cm. long; rays semi-whorled, naked at base, divided upwards. *Spikelets* straw-yellow, linear, small; *glumes* subequal, ovate-lanceolate, acute, slightly keeled, exceeding the flower; floral glume slightly 3-toothed, enclosing the smooth oblong grain; palea none.

Magellan; Fuegia, Ushuaia.

14. A. FUEGIANA Hack.

Cespitose, perennial, with extravaginal innovations. *Culms* erect, to 60 cm. tall, glabrous, binodal, naked upwards. *Leaves* glabrous, their sheaths shorter than the internodes; ligules ovate, acutish; blade linear,

10 cm. by 3–4 mm. (of the innovations narrower). *Panicle* ovate, 12 cm. long, lax, the branches in 2–4's; naked below. *Spikelets* crowded above, lanceolate, 3 mm. long, violet and yellowish. *Glumes* equal, lanceolate, 1-nerved, keel rough; floral glume two thirds as large, oval, round-truncate, 5-nerved, awnless; palea one third as long, nerveless.

South Fuegia. (Dusén.)

15. A. KUFUIM Speg.

Cespitose, glabrous, perennial; long, naked *culms* 20–40 cm. tall, and with subfiliform leaves, which are short, convolute, striate, having ovate rather long ligules. *Panicle* long, lax, the rays subtrichotomous, apically spiculiferous. *Spikelets* ovate, minute, glabrous. *Glumes* not keeled; floral glume with a short caducous awn; *flowers* not bearded at base.

S. Patagon.; Fuegia.

16. A. LECHLERI Steud.

Pale green. *Culms* jointed, erect, glabrous. *Leaf-sheaths* as long as the internodes, lax, glabrous; ligule exserted, hyaline, toothed or cleft; leaf-blades lanceolate, acute, margin rough. *Panicle* long, contracted, from upper leaf; *rays* 2–3-nate, pedicels long, 1-spiculate. *Glumes* subequal, ovate-lanceolate, cuspidate, exceeding the flower; floral glume bifid, dorsally awned; palea similar except the awn.

N. W. Patagon., by Valdivia.

17. A. MACRANTHERA Phil.

Culm 45 cm. long, leafy to the top, smooth. *Panicle* contracted; pedicels equalling the spikelet, 4 mm. long; *glumes* subequal, acuminate; floral glume 1 mm. long, ending in a long awn, 4 mm.

W. Patagon., by Rio Palena.

18. A. MAGELLANICA Lam.

Cespitose, glabrous. *Culms* simple, 30–60 cm., rough below. *Leaves* plane, long linear-lanceolate, gradually narrowing; ligule oval-lanceolate. *Panicle* long, lax, erect, nodding or inclined, its branches scabrid; *glumes* rather large, equal, glabrous or finely pilose, three times as long as the flower, which is bearded at the base; floral glume 4-toothed, 5-nerved, awned midway on back; palea half as long.

Like *A. antarctica* Hook. f., but has larger glumes, greater size, and conspicuous palea.

(S. Chili; also in Kerguelen I., and in islands off coast of New Zeal.); S. Patagon., by RR. Sta. Cruz & Gallegos; Magellan; S. Fuegia; Falklands.

"My specimens have appressed-hirsute peduncles and rachis, glumes subequal, 1-nerved, dorsally rough, 4 mm. long; flower small (1.5 mm. long); the awn scarcely exceeding the glumes." (Speg.)

19. A. MOYANOI Speg.

(Glabrivalve, univalve, muticous.) Grasses densely cespitose, glabrous. *Leaves* rather plane, narrow, acute; ligule ovate, dentate. *Culms* rather tall, clothed to the top. *Panicle* strict, spathaceous-leafy, *rays* di- to trichotomous, laxly rough, naked, 1-spiculate at the apex. *Spikelets* ovate-oblong, acute. *Glumes* carinulate, dorsally rough, enclosing the shorter glabrous *flower*.

Patagon., in meadows along Rio Carren-leofú. Grass 30–50 cm. high. Allied to *A. leptotricha* Desv. but distinguished by its usually 1-nerved floriglume, and the palea altogether wanting.

A. MOYANOI MAJOR Speg.

Culm leafy to the top, *panicle* secund, virescent; *spikelets* large (3–3.25 mm. long); flower larger (2 mm.), more 3-nerved and more rough.

Near Carren-leofú.

A. MOYANOI PLICATIFOLIA Speg.

Leaves rigid, glaucescent, plicate; *spikelets* dark-purplish, floriglume very 3-nerved, and often awned on the back.

By Rio Chubut.

A. MOYANOI PUBERIGLUMA Speg.

Glumes more or less densely pubescent-rough; flower equalling the glumes.

By Rio Carren-leofú.

20. A. NARDIFLORA Griesb.

Rhizome cespitose, descending, with dense-leaved offshoots. *Culm* 20–30 cm. tall, smooth, exsert from the pale glabrous sheaths; ligules acu-

minate; *leaf-blades* convolute-setaceous, recurved, pungent. *Panicle* oblong, purple-stramineous, pedicels rough; *empty glumes* lance-acuminate, exceeding the flower; *floral glume* 5-nerved, its apex lacerate; *awned* above the base; with rudiment of a second flower and a long pilose callus.

N. Patagon.; Catamarca.

21. A. OLIGOCLADA Phil.

Cespitose, 65 cm. tall. *Culm* naked at the top, smooth; as are the leaves. *Panicle* very lax; 2 branches in each semiverticil. *Glumes* green to violet, 4 mm. long; floral glume half as long, awnless.

W. Patagon.; by Rio Palena.

22. A. PATAGONICA Phil.

Culm erect, 60–90 cm. tall, smooth, leafy to the top. *Leaves* rough on both sides, their sheaths glabrous; ligules oblique, 4 mm. long. *Panicle* 20 cm. long, dense, cernuous; rays 20 or more in the lower whorls, unequal; *pedicels* capillary, rough, as long as the spikelets. *Glumes* nearly 3 mm. long, ovate-acute, ciliolate-carinate; floral glume scarcely half as long, ovate, 5-nerved, with a short terminal *awn; palea* half as long as the floral glume.

N. Patagon.; by Lago Nahuel-huapi.

23. A. PAUCINODIS Hack.

Cespitose, erect, geniculate, with 1, rarely 2, nodes, both in the lowest quarter of the 50 cm. *culm*, compressed, glabrous. *Sheaths* compressed, all split, scaberulous upwards. *Ligules* 3–4 mm. long, truncate; *leaf-blade* 8–10 mm. by 4–5 mm., flat, glabrous, except on the edges and upper surface. *Panicle* broad-ovate, lax; the rachis scabrous upwards; rays whorled, the lower 7–10, unequal, undivided, and naked nearly halfway up. *Spikelets* pallid. *Glumes* subequal, narrow-acuminate, setaceous, keeled; keel of second glume scabrid. Floral glumes broad-ovate, half as long as the others, glabrous, entire, 5-nerved, obtuse, awned. Callus minutely bearded. Palea smaller, oval-oblong.

Magellan.

24. A. PROSTRATA Hook. f.

Low, glabrous, creeping; *culm* 8–10 cm. tall, stoloniferous. Leaves rather plane and smooth. *Panicle* linear-oblong; floral glume truncate,

nerveless and awnless. Allied to *A. alba stolonifera*, but distinguished by smaller size, coarctate panicle, smaller spikelets and flowers, and absence of awn.

Falklands, rare.

25. A. PYROGEA Speg.

Rhizome creeping. *Culms* long, 30–40 cm., naked. *Leaves* plane, rather rigid, striate, upper surface somewhat rough, abruptly triangular-acute at apex; ligules long-lanceolate. *Panicle* lax, the rays smooth, nude, alternately spiculiferous at the apex. *Spikelets* ovate, minute, glabrous; the *glumes* subequal; scarcely exceeding the flower, not keeled; *floral glume* enclosing the grain, 5-toothed, with a fine dorsal awn; palea wanting; flowers bearded at base.

S. Patagon., by Lago Argentina; Fuegia, maritime dunes and sands.

26. A. RINIHUENSIS Phil.

Cespitose. *Culms* 18 cm. tall, sheathed to the panicle. *Leaves* plane or folded, smooth. *Panicle* green-violet, 6 cm. long, rays in semi-verticils 3–5, spiculiferous at apex. *Glumes* glabrous; floral glume one third as long as the lower, truncate, toothed, hyaline; the *awn* arising upward, straight, 6 times as long as the glume.

Patagon., valley of Rio Rinihue.

27. A. SANCTACRUZENSIS Speg.

(Glabrivalvule, bivalvule, microvalvule.) *Awnless*, all glabrous. *Leaves* plane, narrow, mediocre, herbaceous; ligules ovate-lanceolate, long. *Culms* with 2–3 lower nodes sheathed beyond the middle. *Panicle* laxly subcontracted, narrow, subcernuous, interrupted; rays moderately long, the shorter erect-appressed, the longer spreading from their base, densely spiculiferous from their base or middle. *Spikelets* lanceolate, small. *Glumes* very acute, but not awned, spinulose-scabrid on the keel and sides. Callus obsoletely and very shortly bearded antrorsely.

S. Patagon., in wet places along Rio Sta. Cruz.

28. A. SERRANOI Phil.

Annual. *Culm* 27–40 cm. tall, the highest internode very long. *Leaves* plane above, the sheaths roughish. *Panicle* lax, divaricate; the

rays and raylets opposite, not whorled. *Glumes* stramineous; the floral glume half as long as the lower, *awnless*.

W. Patagon.; by Rio Palena.

29. A. TEHUELCHA Speg.

(Glabrivalvule, bivalvule, microvalvule.) *Awnless*, all glabrous. *Leaves* plane, narrow, rather short, herbaceous; ligules ovate, longish. Lower 2–3 nodes of the *culm* sheathed above the middle. *Panicle* contracted, spike-like, lobately subinterrupted, erect; *rays* short, appressed, densely spiculiferous from the base or nearly so. *Spikelets* lanceolate, small. Keel and sides of *glume* spinulose-rough, acute-awned. Callus glabrous.

Patagon., in wet places along Rio Sta. Cruz, and Carren-leofú.

30. A. TENUIFOLIA Bieb.

Culms about 50 cm. tall, with subsetaceous, obscurely scabrid *leaves*. *Floral glume* truncate, 4-toothed, 4-nerved, with or without a short dorsal awn; *palea* none, or very short. (Near *A. exarata* Trin.)

(Eurasia); Magellan.

31. A. UMBELLATA Colla.

Culm and linear *leaves* both strict and rather scabrous. *Panicle* contracted, glabrous. *Rays* verticillate, the verticils umbellate; raylets capillary, subquaternate, 1-flowered. Empty and floral *glumes* equal, acuminate, scarious, *awnless*. *Grain* free.

(Chili); Chubut, in mountain meadows near Rio Carren-leofú. The Patagonian specimens vary; spikelets stramineous or violascent.

32. A. VAGINATA Phil.

Culm 27 cm. tall, entirely sheathed. *Leaves* 3 mm. broad, smooth, also the sheaths. *Panicle* contracted, 6–5 cm. long, the semi-verticils approximate. *Glumes* violet; floral glume half as long as the lower, its *awn* exserted.

W. Patagon.; valley of Rio Palena.

23. CALAMAGROSTIS Adans. (including *Deyeuxia* Clar.).

Panicles having 1-flowered spikelets, often with the rudiment of a second. Glumes 3, 2 of them empty, keeled, the third or floral glume, shorter, obtuse, dorsally awned, hairy at the base, enclosing a shorter

palea and a flower; the rudimentary second flower being usually a prolonged, tufted rachilla. Grain free; seed adherent to the pericarp.

Species 130, in temperate and cold parts of the E. and W. Hemispheres; and many in the Andes. The new-world species belong to the section *Deyeuxia*, having hairy prolongation of the rachilla, and the callus hairs short or obsolete.

KEY TO THE SPECIES.

A. Panicle lax. Floriglumes awned.
- *b.* Scabrid. Glumes subequal, nearly twice as long as the flower.
  - *c.* Low, cespitose, 10 cm. Panicle purplish. Spikelets long, 30 mm. *erythrostachya.*
  - *c2.* Tall, 70 cm., from a creeping root. Panicle subsecund, partly nutant. *montevidensis.*
- *b2.* Smooth.
  - *c.* Awns and glumes 4 mm. Spikelets 6 mm. Cespitose, culms 8 cm. Panicle narrow, lax, secund. *suka.*
  - *c2.* Awns short.
    - *d.* Glumes 4 mm., violet. Floriglume 2 mm. Culm 60 cm., naked above. Rays in 3's and 5's. *laxiflora.*
    - *d2.* Glumes 6 mm. Panicle large, rays in 2's and 3's. *hirthi.*
    - *d3.* Glumes subequal, as long as the flower and the awn. Culm 50 cm., from a creeping base. Leaves rough-edged, at first flat. Panicle narrow, spreading. *neglecta.*

A2. Panicle contracted, mostly spike-like. All glabrous.
- *b.* Awnless. Small, 12 cm., from a creeping root, with small flat leaves. Panicle few-flowered. Spikelets 3 mm., with rudiment of a second flower. *freticola.*
- *b2.* Awned.
  - *c.* Leaves plane.
    - *d.* Culm 20 cm., rough upwards. Rays short. Spikelets 3 mm. No second rudiment. *fuegiana.*
    - *d2.* Culm robust, 65 cm. Glumes 5 mm. Floriglume truncate. Awn short. *magellanica.*
    - *d3.* Culm glabrous, sheathed above second node. Floriglume with long basal villosity, and awn its own length. *patagonica.*
  - *c2.* Leaves convolute. Culm 45 cm. Rays short, few-flowered. Spikelets only 2 mm., bluish. Awn short. *poæoides.*
  - *c3.* Leaves complicate, subpungent. Culm erect, 3–4 nodes sheathed. Spikelets small, 1-flowered. Floriglume with short basal hairs, and short awn. *ameghinoi.*

1. CALAMAGROSTIS (DEYEUXIA) AMEGHINOI (Speg.).

Chætophora; not or scarcely subcespitose, glabrous, stoutish; *culm* erect, straight, 3–4 nodes below the middle sheathed more than half way. *Leaves* more or less complicate, pallidly green, glaucescent, rather rigid, subpungent, not scabrid. Ligule very short, truncate. *Panicle* contracted,

spike-like, obscurely violascent, subcontinuous. *Spikelets* small, 1-flowered; rachilla villous, more than half as long as the flower. *Glumes* subequal, violascent, scarcely carinate, not scabrid, acutish, 3-nerved. Flower slightly shorter than the glumes, and more pallid. Floriglume 5-nerved; the dorsal nerve usually ending in a *short awn;* apex truncate, 6-dentate, its base densely surrounded with white hairs nearly as long as itself.

S. Patagon., in dry meadows by Rio Chico, near Chonkenk Aike.

2. C. ERYTHROSTACHYA Desv.

Culms cespitose, 5–12 cm., smooth. *Leaves* convolute, setaceous, scabrid. *Panicle* purplish; spikelets 25–35 mm. long. *Lower glumes* subequal, narrow, acuminate, dorsally scabrid, scarcely twice as long as the flowers. *Floral glume* ovate, 4-nerved, 2-lobed, the lobes 2-toothed, awned above their base; the *awn* twisted below. Palea shorter, and still shorter in the sterile flowers.

(Chili); Fuegia.

3. C. FRETICOLA (Speg. sub *Deyeuxia*).

Creeping, small; *culms* slender, sheathed to the top, 10–15 cm. tall. *Leaves* small, plane, glabrous with short truncate ligules. *Panicle* small, spike-like, few-flowered; spikelets 1-flowered with a rudiment of a second. *Floral glume* obtusely toothed at top, *not awned* nor mucronate, embracing the longer palea.

Fuegia; Magellan.

4. C. FUEGIANA Speg.

Cespitose, glabrous; *culm* erect, 20–25 cm. long, sheathed, rough upwards, exceeding the leaves; *leaves* plane, ligule very short. *Panicle* spike-like, its rachis rough, its rays short. *Spikelets* dense, 3 mm. long, lanceolate, *glumes* equal. No rudiment. Flowers villous at base; floral glume awned below the apex.

Magellan, Punta Anegada. S. Patagon. by R. Sta. Cruz.

5. C. HIRTHI Phil.

Tall and smooth. *Panicle* very large, lax, with 2's and 3's of capillary branches which are naked below. *Glumes* 6 mm.; palea 4-toothed above, the *awn* scarcely surpassing it.

W. Patagon., Valley of Rio Palena.

6. C. LAXIFLORA Phil.

60 cm. tall, smooth, naked above; *leaves* plane, short. *Panicle* 17 cm. long, rather lax, with semi-verticils of 3–5 rays. *Glumes* 4 mm. long, violet; floral glume half as long, surrounded by soft hairs of its own length; very shortly *awned.*

W. Patagon., Valley of Rio Palena.

7. C. MAGELLANICA Phil.

Culm robust, 65 cm. or more in height. Leaves plane, 4 mm. broad, smooth, as are their sheaths; *leaves* of sterile shoots shorter. *Panicle* above the leaves, 12 cm. long, contracted, its rays scabrid. Pedicels short. *Glumes* 5 mm. long, green, hyaline at top; floral glume truncate and toothed, briefly awned.

Magellan.

8. C. MONTEVIDENSIS Nees.

Root creeping, ringed. *Culm* simple, smooth, 60–90 cm. tall. *Leaves* linear, scabrid, the ligules short, round, at length lacerate. *Panicle* semi-verticillate, spreading, subsecund, apically nodding. *Glumes* subequal, linear-lanceolate, acuminate, nearly twice as long as the flower. Floral glume only exceeding the palea; the hairs as long as the flower or longer. Apical *awn* exserted.

N. Patagon. (and Montevideo).

9. C. (DEYEUXIA) PATAGONICA (Speg.).

Cespitose, glabrous. *Leaves* plane, rigid, scaberulous, shorter than the glabrous *culm* which is sheathed above the middle of the second node. Ligule subtruncate, narrow, scarious, denticulate. *Panicle* narrow, contracted, densely flowered; rachis glabrous. *Rays* branching, some shorter, and spiculiferous from their base, others longer and spiculiferous from their middle, scabrid; pedicels pubescent, not equalling or slightly surpassing the spikelets. *Spikelets* lanceolate, compressed; *glumes* equilong, acute, 1-nerved, lightly carinate, scarcely scaberulous, 1-flowered; flower shorter than the glumes; *floriglume* acute, entire or scarcely bidentate, 3-nerved, dorsally scabrous, basally surrounded by villosity fully as long as itself, having a subapical awn as long as itself and longer than the empty glumes; the very slender produced rachilla half as long as the flower and softly villous especially at its apex.

Chubut, in elevated meadows near Rio Carren-leofú; a grass 35–50 cm. high.

10. C. NEGLECTA Gaertn. (*C. stricta* Beauv.)

Creeping; *culm* simple, strict, glabrous, 45–60 cm. tall. *Leaves* linear, acuminate, plane, convolute when dry, rough-edged, ligule exserted, obtuse. *Panicle* narrow, spreading, 10–20 cm. long; *glumes* equal, oblong, acute, equalling the flower; *palea* half as long as the floral glume. *Awn* inserted below the middle, as long as the glume.

(N. Amer. and Eur.) S. Patagon. in Valley of Rio Gallegos; and N. and E. Fuegia (Dusén). (Fig. in Brit. & Br. i, 165.)

11. C. POÆOIDES Steud.

Culm 45 cm. tall, smooth, simple, or branched below. *Leaves* convolute, the sheaths long, striate. *Panicle* somewhat spike-like, lobed, 7 cm. long, the rays short, few-flowered. *Spikelets* dense, 2 mm. long, bluish; the *glumes* subequal, ovate-lanceolate, exceeding the flower, with tufts of shorter hairs; floral glume *short-awned*, as long as the palea.

Magell.; Fuegia; S. Patagon. by Rivers Gallegos and Sta. Cruz.

"Handsome, but my (Fuegian) specimens have a small truncate, not ovate, ligule." (Speg.)

12. C. SUKA Speg.

Cespitose, glabrous. *Culms* 5–10 cm. tall. *Leaves* plicate, much shorter than the culm, which is sheathed to its middle; ligule rather long, truncate, pectinate. *Panicle* narrow, lax, secund, the rachis glabrous, the rays branching, slender. *Spikelets* lanceolate, compressed; *glumes* equal, 3–3.5 mm. long, scabrid-margined and nerved; floral glume awned, the *awn* as long as the glume; flower with dense villi.

Fuegia (Brecknock Pen.); Navarino I.

24. HOLCUS Linn.

Spikelets crowded in an open *panicle*, with two flowers, the lower perfect and awnless, the upper staminate, with a stout bent dorsal *awn*.

H. LANATUS Linn. Velvet-grass.

Soft, downy, pale, 30–60 cm. tall, the panicle 5–10 cm., pale-reddish; second glume awned.

(Eur., N. Amer.) Magellan (Dusén).

25. ERIACHNE R. Br.

Leaves convolute-terete, rarely plane. *Panicle* dense or lax. *Spikelets* equally 2-flowered. *Glumes* 4, 2 of them empty, many-nerved, keeled, acute, subequal; 2 floral glumes equal, fewer-nerved, dorsally ciliate, *awnless* or *straight-awned*, at length indurated with the enclosed *palea* around the free grain; palea 2-toothed or 2-awned.

Species 22, chiefly Australian; some in tropical Asia.

E. MALOUINENSIS Steud.

Culm divided from the base, ascending, 12 cm. high. Basal *leaves* fasciculate, convolute, one third as high as the culm; culm-leaves only 6 mm. beyond their sheaths. *Panicle* simple, the rays 1-flowered. *Glumes* ovate-obtuse, yellow-white and purple.

Magellan; Falklands.

26. AIROPSIS Desv.

Low annuals with nearly subulate *leaves* and a narrow *panicle* of subequal, 2-flowered globose *spikelets*, having a very short rachilla continuing the pedicel. *Empty glumes* 2, obtuse, awnless; *floral glumes* 2, slightly shorter, at length rigid and enclosing the grains.

Species 2; one in W. Eur. and N. W. Afr.

A. MILLEGRANA Gris. (*Eragrostis airoides* Nees.)

Culm strict, simple; *sheaths* hairy-margined; *leaves* convolute, smooth. *Panicle* long, spreading, its rays semiverticillate. *Spikelets* shorter than the pedicels, oblong. *Floral glume* shortly serrulate, as long as the flowers.

(Brazil); N. Patagon.

27. AIRA Linn. Hair-grass.

Mostly annuals with narrow *leaves* and contracted or open *panicles* having capillary *rays*. *Spikelets* small, 2-flowered. *Glumes* 4, hyaline; 2 empty, subequal, acute, persistent; also 2 floral glumes, deciduous, dorsally *awned* below the middle; palea a little shorter. *Grain* enclosed in the glume and palea.

Species 6, in Eur. and N. Afr.; one in all temperate lands.

(Forms having the rachilla produced are removed to *Deschampsia*.)

1. A. ATROPURPUREA Wahlenb. (Scheele sub *Deschampsia*). (*A. magellanica* Hook. f.)

Cespitose, erect, 20 cm. tall. *Leaves* plane, puberulous above; ligule ovate, truncate, toothed. *Panicle* lax, 7 cm. long, its branches paired, slender, apically spiculiferous. *Spikelets* 4 mm. long, 2-flowered; *glumes* ovate-lanceolate, acute, purplish or green at the base; *flowers* shorter, the lower subsessile. *Floral glume* long, truncate, silky at base, ciliate-toothed, *awned* above the middle, the awn straight and included. (Fig. 36.)

(Lapland; Arctic Amer.) Magellan, Puerto del Hombre.

FIG. 36.

Aira atropurpurea. Inflorescence; spikelet and essential organs.

2. A. CARYOPHYLLEA Linn. Silvery Hair-grass.

Slender, cespitose, glabrous, 10–20 cm. tall, with silvery lax *panicle* having its rays in 2's or 3's. Ligules 3 mm. long; *leaf-blades* 1–3 cm. long, soft, narrow, soon twisting. *Spikelets* erect, silvery; *glumes* 2–3 mm. long, ovate, acute, 1-nerved; floral glume shorter, with projecting dorsal *awn*.

(Eur., naturalized in N. Amer. Fig. in Brit. & Br. i, 168.)

Falkland Is., introduced.

3. A. SPICIFORMIS Steud.

Cespitose and smooth; *culms* erect, 10–15 cm. tall. *Ligule* hyaline, oblong. *Panicle* contracted, spike-like or oblong, 25–35 mm. long; the rays short, few-spiculate; the spikelets violet and green, 2-flowered. *Glumes* not equalling the flowers, glabrous; floral glume ovate, incompletely 3-nerved. Palea ovate, its margin ciliolate.

Magellan; W. Fuegia.

"Very beautiful. My specimens differ from the type, having the color not or scarcely glaucescent, panicle linear, lower valvule 5-nerved." (Speg.)

4. A. SUPERBIENS Steud.

Cespitose; *culms* erect, pale-stramineous, 30–60 cm. tall, rough above. *Sheaths* lax, often purplish; *ligule* hyaline, acute; *leaf-blades* linear-lanceolate, 12–25 mm. long, pungent. *Panicle* spike-like, the rays in 3's and

5's, few-spiculate. *Glumes* ovate-lanceolate, subequal, not as long as the *awnless* flowers; *floral glume* woolly-ciliate. One *flower* usually viviparous, colored amethyst.

Magellan.

5. A. VESTITA Steud.

Cespitose, fertile and sterile intermixed with dry sheaths. *Fertile culms* 30 cm. tall. Radical *leaves* narrow-convolute, half as high as the culm. *Panicle* contracted, 5 cm. long, its rays naked at their base, 2–3 times forking. *Spikelets* silvery to yellow; *glumes* ovate, nearly equalling the flowers; these surrounded by basal cilia. *Floral glume* awned at base, the *awn* not twisted.

Magellan.

28. DESCHAMPSIA Beauv.

Panicle contracted or lax, the *spikelets* usually 2-flowered, and with the rachilla hairy-prolonged or bearing an additional staminate flower. The 2 *empty glumes* keeled, subacute; the floral glumes truncate, toothed, dorsally *awned* about the middle; *palea* narrow. *Awns* mostly keeled (straight in sect. *Campella*).

Species 20, in cold and temperate regions. Like *Aira*, but distinguished by the produced rachilla, or floral rudiment, by longer spikelets, and somewhat stouter habit.

KEY TO THE SPECIES.

A. Panicle lax.
- *b*. Cespitose. Floriglumes awned.
  - *c*. Low, 5 cm., leafy, the leaves subulate, linear, involute. Straight basal awn. Extra rudiment. *antarctica.*
  - *c2*. Leaves convolute-setaceous. Spikelets 5 mm., violaceous. Awn protruding.
    - *d*. Culm 20 cm. Panicle dense. Awn 3 mm. *martini.*
    - *d2*. Culm 50 cm., nearly naked. Awn basal. No rudiment. Rays in 2's. *flexuosa.*
- *b2*. Erect, 60 cm. Leaves linear, with long ligules. Rays fasciculate. Spikelets 6 mm.; mid-dorsal awn as long as floriglume. *grandiflora.*

A2. Panicle depauperate.
- *b*. Awnless. Rays in 2's to 5's. Culm erect, 75 cm. Leaves short, scabrid. Glumes purple and gold. Long infrafloral stipe. *pulchra.*
- *b2*. Awned. Rays in 2's. Glumes violet.
  - *c*. Culm slender, naked upwards; its one leaf convolute-filiform. Floriglume 4 mm., with long jointed awn. *tenella.*
  - *c2*. Culm 30 cm. Leaves few, flat, short. Spikelets 4 mm. Floriglume and its dorsal awn only 2 mm. *brachyphylla.*

*A*3. Panicle contracted.

b. Leaves acicular, short, few. Panicle long-linear. Rays in 2's. Glumes violet. *aciphylla.*

*b*2. Leaves filiform. Panicle weak, rays flexuose. Spikelets large, violet; flowers whitish. Awn geniculate. *discolor.*

*b*3. Leaves setaceous.

c. Culms 10 cm., leafy. Panicle few-flowered. Floriglume bifid. Awn geniculate. *parvula.*

*c*2. Culm 20 cm., sheathed at base. Rays in 2's. Spikelets 10, 4 mm. long, purplish. Awn basal, long. *fuegiana.*

FIG. 37.

Deschampsia antarctica. The plant slightly reduced, showing its panicle; also a spikelet magnified and floral glume with rudiment.

1. D. ACIPHYLLA (Franch.) Speg.

Cespitose. *Culms* 30 cm. tall, slender, smooth. *Leaves* acicular, many times shorter than the culms, only 1–2 on the culm; ligules lanceolate. *Panicle* long-linear, with paired, scaberulous, capillary rays, these erect along the axis. *Lower glumes* violet; flowers not exceeding the glumes; the lower sessile, the upper on the bearded axis surrounded by hairs.

Magellan; Fuegia. (*D. tenella* Phil. differs only by larger stature and habit.)

D. ACIPHYLLA PUMILA (Franch.).

Only 7 cm. high; *panicle* short.

The type and the var. both at Punta Arenas.

2. D. ANTARCTICA (Hook. f. sub *Aira*). (*Airidium elegantulum* Steud.)

Low, cespitose, 2–7 cm., leafy; the *leaves* with long sheaths, subulate-linear, involute. *Panicle* large, 10–15 cm. long, effuse. *Spikelets* lanceolate, 1–2-flowered, with rudiment of a third. *Glumes* lanceolate, rough-keeled, exceeding the flowers; floral glume deeply cleft, with a straight basal *awn*. (Fig. 37.)

(Mendoza); Magellan; Fuegia, Punta Anegada; Falklands (also in Kerguelen I., South Shetlands and South Georgia).

3. D. BRACHYPHYLLA Phil.

Culm 30 cm. tall, naked upwards, few-leaved, glabrous. Leaves plane, short, their ligules long. *Panicle* 10 cm. long, depauperate, 2 rays in the semiwhorls; *spikelets* about 10, subsessile, 4 mm. long. *Glumes* violet, their margin tawny; *floral glume* half as long, the dorsal *awn* its own length; the floral hairs shorter.

W. Patagon., Valley of Rio Palena.

4. D. DISCOLOR (Thuill. sub *Aira*) R. & S.

Culm erect; radical *leaves* long, almost filiform; ligule very acuminate. *Panicle* weak, contracted, its rays capillary, flexuose. *Spikelets* rather large; *glumes* violet, equalling the white, geniculately *awned* flowers.

(N. and Central Eur., N. Chili.) Fuegia.

5. D. FLEXUOSA (L.) Trin. (*Aira f.*)

Cespitose; *culms* 50 cm. high, nearly naked; *leaves* convolute, setaceous. *Panicle* spreading, rays capillary in pairs, spiculate at apex. *Spikelets* 5 mm. long; *glumes* scarious, violet towards base, equalling the flowers, the second slightly longer than the first. Pedicel of the upper flower short, pilose. *Awn* of floral glumes arising low and protruding from the spikelet.

(Eur., N. Asia; Greenland; N. Amer.) S. Patagon.; Magell.; Fuegia; Falklands. (Brit. & Br., i, 170.) "Common everywhere by sea-coast and on mountains of Fuegia." (Speg.)

6. D. FUEGIANA Phil.

Subcespitose, glabrous; *culms* 22 cm. high, densely sheathed at base. *Leaves* convolute-setaceous. *Panicle* 6 cm. long, contracted, rays 2 in the semiwhorls, these naked below, 10-spiculate. *Spikelets* 4 mm. long, purple, tawny-hyaline at top. *Floral glume* glabrous at base, not cleft, its *awn* basal, exceeding the palea.

E. Fuegia.

7. D. GRANDIFLORA (Nees). (*Aira grandiflora.*)

Culm erect, 60 cm. tall; *leaves* linear, striate, smooth, shorter than the culm, the lower complicate; ligules long, bifid. *Panicle* lax, spreading, its

rays fasciculate, smooth; its rachis pilose-hoary. *Spikelets* 6 mm. long, smooth. *Floral glume* 4-toothed, its *awn* mid-dorsal, equalling its own length.

(Chili); Fuegia.

8. D. KINGII (Hook. f.). (*Aira kingii.*)

Tall, 60–120 cm., glabrous; *culms* cespitose, with 2–3 nodes. *Leaves* narrow-linear, striate, their margin involute; ligules oblong, scarious-white. *Panicle* long, lax, the rays whorled. *Glumes* white, lanceolate, 3 times as long as the flowers; *floral glumes* silky-bearded at base, truncate, 3-nerved, the mid-nerve produced as a straight *awn*. (*Trisetum dozei* Franch. is probably the same, fide Speg.) (Fig. 38.)

FIG. 38.

Deschampsia kingii. Panicle, reduced; also enlarged spikelet and essential organs.

Magellan; W. Patagon.; Fuegia, everywhere in elevated meadows.

9. D. MARTINI Phil.

Cespitose, glabrous, 20 cm. high; *leaves* convolute-setaceous. *Panicle* many-flowered, ovate or pyramidal, rather compact, 6 cm. long, 3–5 rays in semiwhorls. *Spikelets* fully 5 mm. long, on short pedicels. *Glumes* violet at their base; rachis glabrous; *floral glume* 4-toothed, its *awn* flexuous, exserted 3 mm.; palea as long.

Falklands.

10. D. PARVULA (Hook. f.). (*Aira parvula.*)

Cespitose; *culms* erect, 7–12 cm. high, often divided, leafy. *Leaves* shorter, setaceous; ligules long, scarious-tipped. *Panicle* contracted, few-flowered, its rays short and spikelets erect. *Glumes* lanceolate, acuminate, 3 times as long as the flowers; *floral glume* broad-ovate, basi-bearded,

apically bifid between 2-toothed segments, awned dorsally, the *awn* jointed.

Patagon.; Fuegia; Cape Horn.

11. D. PULCHRA Nees & Mey.

Culm erect, 60–90 cm. high. *Leaves* short, 5 cm. long, convolute, scabrid. *Sheaths* striate, smooth; ligules long, acute. *Panicles* with 2–5 slender branches. *Spikelets* variegated, white-purple and gold. *Glumes* subequal, as long as the flowers. *Stipe* of the upper flowers usually half as long as the flowers, pilose. *Floral glume* with praemorsely toothed apex, *scarcely awned.*

(Chili); Patagon.

12. D. TENELLA Phil.

Culm slender, naked upwards; upper *leaf* convolute-filiform. *Panicle* 10 cm. long, 2 rays in each semiverticil. *Glumes* cuspidate, entire at apex, violet at base; *floral glume* 4 mm. long, 4-toothed, its *awn* geniculate, twice as long as the palea.

W. Patagon., Valley of Rio Palena.

29. TRISETUM Pers. False-oat.

Leaves flat; *panicle* dense or lax. *Spikelets* 2 rarely 3–6-flowered, the rachilla produced as a hairy bristle or an imperfect flower. *Glumes* keeled, the lowest 2 empty and unequal; the *floral glume* thinner, acute or bifid, with a dorsal *awn*, which is usually bent and twisted; palea narrow.

Species 50, in temperate regions by the Mediterr., many in N. Amer., also in Chili. 1 each in S. Afr., Madagascar, Himal., the Orient, and N. Zeal.

KEY TO THE SPECIES.

A. Spikelets 2-flowered.

b. Panicle in a spathe, or protruding. Leaves lanceolate. Awn twice as long as its floriglume. (One of the flowers of a spikelet is easily lost.) *fraudulentum.*

b2. Panicle lax.

c. Panicle large. Leaves broad, long-sheathing. Floriglume 3–4-toothed; awn straight, not long. *dozei.*

c2. Panicle broad, dense, short. Floriglume 2-aciculate, awned. *aureum.*

A2. Spikelets 2–3-flowered.

b. Panicle lax, long, nodding, its rays fasciculate. Leaves linear. Spikelets 6 mm. long. Awn bent. *cernuum.*

b2. Panicle spike-like.

c. Tufted, 40 cm. Leaves linear-lanceolate, velvety. Spikelets silvery or purplish. Floriglume bifid, with short awn. *spicatum.*

c2. Erect, 25 cm., and sterile culms. Leaves flat, hairy. Spikelets 5 mm. long, with extra rudiment, variegated. Floriglume long, awned. *subaristatum.*

A3. Spikelets 3–4-flowered. Panicle spike-like.

b. Creeping. Culms 70 cm. Leaves scabrid inside. Spikelets 4 mm. Floriglume 5-nerved, scabrid, awned or awnless. *repens magellanicum.*

b2. Erect, 40 mm. Leaves linear-acuminate, with scabrous margin. Spikelets 5–7 mm. long. Floriglume 2-mucronulate, awn as long as itself. *variabile.*

1. T. ANTARCTICUM Trin. (non Nees).

Erect, glabrous. Lowest node hairy. Sheaths and *leaves* 10–15 cm. long, narrow-linear, scabrid on edges, otherwise glabrous. *Panicle* 7–10 cm., contracted to lax. *Spikelets* about 4-flowered, 7 mm. long. *Empty glumes* unequal, the lower narrow, the upper ovate-acute. *Floral glume* glabrous, 6 mm. long, acute, 2-mucronulate, awned two thirds up, *awn* its own length. Palea shorter.

(Chili; N. Zealand); Patagon. and Fuegia. (Speg.)

2. T. AUREUM Tenore. (*T. condensatum* Presl.)

Panicle broad, rather dense, short. *Spikelets* 2-flowered, the upper glume a little larger. *Floral glume* 2-aciculate, awned above the middle. Ovary naked. Callus naked. *Rachis* with very short hairs.

Fuegia.

FIG. 39.

Trisetum dozei. Panicle, and enlarged spikelet, and floral glumes. (After Franchet.)

3. T. CERNUUM Trin.

Culm slender, 70 cm. tall. Sheaths smooth or hairy, *leaf-blades* about 17 cm. by 7 mm. *Panicle* open, slender, nodding, 20 cm. long, its rays in clusters, capillary. *Spikelets* usually 2–3-flowered, 6 mm. long; *empty glumes* 3 and 4 mm. long; *floral glume* scabrous, ovate-lanceolate, its *awn* bent. *Grain* with hairy tip.

(Arctic Russia, there with glabrous grain; Japan; Calif.); Fuegia.

4. T. DOZEI Franchet. (May be *Deschampsia kingii* Hook. f.)

Cespitose; *culms* smooth, 30–90 cm. tall. *Leaves* broad, folded, long-sheathing. *Panicle* large, its rays

smooth, elongate. *Glumes* lanceolate, the lower longer and 3-nerved. *Flowers* 2, enclosed in hairs, not exceeding the glumes. Rachilla rough, produced. *Floral glume* 3–4-toothed, with straight submedian *awn* not exceeding the glumes. (Fig. 39.)

Patagon., Churucca; Fuegia to Cape Horn.

5. T. FRAUDULENTUM Steud.

Glabrous throughout; *culm* 90 cm. tall; *leaves* lanceolate, their sheaths lax, shorter than the internode, ligules exserted, oblong, cleft. *Panicle* in upper spathe-like leaf, sometimes protruding. *Spikelets* 2-flowered; the *glumes* unequal, the lower ovate, twice as long as the lanceolate upper. The upper flower with hairy pedicel. *Awn* twice as long as its glume.

(The pediceled flower is easily deciduous, leaving its pedicel as in *Calamagrostis*.)

S. Patagon., by Rivers Gallegos and Sta. Cruz; Magellan.

6. T. REPENS (L.) MAGELLANICUM Desv. (*T. glaucum* d'Urv.)

Creeping. *Culms* 49–90 cm. long. Ligules short, toothed; *leaves* plane or convolute, scabrid inside. *Panicle* spike-like, 8–15 cm., green *Spikelets* erect, lax, oblong-elliptical, compressed, 12–16 mm. long, 3–4-flowered. *Empty glumes* subequal, as long as the spikelet, oblong-elliptical, convex, 4–6-nerved, muticous or mucronate, inequilateral, erose-toothed, scabrid outside. *Floral glume* 5-nerved, oblong-elliptical, awned or not, dorsally scabrid.

Magellan; Port Gallaret: Puerto del Hombre. Ushuaia. Falklands.

T. SECUNDUM Kth. Mts. of Fuegia.

7. T. SPICATUM Richter. (*Aira* s. of L. *T. subspicatum* Beauv.)

Tufted, 10–60 cm. high; sheaths pubescent, 3 cm. long, ligules scarious, blades flat. *Panicle* spike-like, interrupted, silvery or purplish, 3–10 cm. long. *Spikelets* flattened, 2–3-flowered, produced rachilla as a bristle or a glume. *Empty glumes* about 5 mm. long, sublanceolate; *floral glume* as long, its awn varying in length.

(Fig. in Brit. & Br. i, 171. Eurasia by Arctic regions to N. Amer. and to Andes of Peru; also in Australia, N. Zeal., Campbell's I.) Falklands; Magell., Fuegia to Cape Horn.

"Its great abundance in the New World, and especially in the extreme south of America, coupled with its rarity in the southern regions of the

Old World, where it is only known on the tops of Campbell's Id., seems to indicate its having been transmitted from east to west as against the course of the prevailing winds in the antarctic regions." (J. D. Hooker.)

T. SPICATUM PHLEOIDES (Kunth).

A robust form.

Punta Arenas, and nearly everywhere in Fuegia (Dusén). Also a slender form at Ushuaia and Navarino I.

"That of Horn Id. is velvety throughout, and represents *T. phleoides* Kunth." (Franchet.)

8. T. SUBARISTATUM Desv.

Erect, 22–30 cm. *Leaves* 4–7 cm. long, plane, pubescent-tomentose. Ligule ovate, dentate-ciliate; sheaths longer. *Sterile culms* low. *Panicle* 5 cm. long, cylindraceous, spike-like, shining, variegated. *Spikelets* 2–3-flowered, with a pilose rudiment, 4–5 mm. long. *Glumes* unequal, the lower lanceolate, 1-nerved; the upper larger, obovate, 3-nerved; pedicels pilose. *Floral glume* glabrous, long, 5-nerved, *awned* below the apex.

S. Patagon., by Rio Sta. Cruz, rare.

9. T. VARIABILE E. Desv.

Culm erect, 30–60 cm. tall, with 2–3 glabrous nodes. *Leaves* plane, linear, acuminate, scabrous-margined. *Panicle* spike-like, 7 cm. long, shining. *Spikelets* 5–7 cm. long, shining, 3–4-flowered. *Flowers* 5–6 mm. long. *Glumes* unequal, the lower narrow, linear, the upper ovate, acute, shorter than the spikelet. *Floral glume* 5 mm. long, rough, 2-mucronulate, *awned* two thirds up; awn as long. Palea scarcely as long.

(Chili); Magellan; Fuegia (Brecknock Pen.).

T. VARIABILE VIRESCENS (Nees).

Leaves pilose, broad and rough (7 mm. by 30 cm. long); *ovary* glabrous. *Spikelets* about 3-flowered, glaucous to green.

(Central and S. Chili); Magell., Fuegia.

30. AVENA Linn. Oat.

Spikelets few-flowered, rarely 1-flowered, in a loose panicle; rachilla articulate above the two empty glumes, hairy under the floral glumes. *Empty glumes* subequal; the floral smaller, rounded on back, with a

dorsal twisted *awn; palea* narrow. *Grain* furrowed, mostly pubescent, often adhering to the palea. Upper flower often imperfect.

Species 30, chiefly in temperate parts of the Old World.

1. A. FATUA Linn.

Culm erect, glabrous, smooth. *Leaves* broad, scabrid, aculeolate. *Panicle* equal, erect, its rachis scabrid. *Spikelets* oblong, 3-flowered. Flowers all *awned*, pilose at base with rufescent hairs. *Seeds* soon caducous.

(Europe, in fields); S. Patagon., in elevated meadows by Rio Sta. Cruz.

2. A. HIRSUTA Roth.

Culm half to more than one meter high. *Leaves* plane, scabrid. Ligules ovate, rounded. *Panicle* simple or compound, nodding. *Spikelet* 3-flowered, having (1) an inferior, fertile long-awned flower, (2) a muticous fertile flower, (3) an upper abortive muticous flower. *Glumes* lance-acuminate, 7–9-nerved, exceeding the flowers.

S. Patagon., by Rio Sta. Cruz.

3. A. LEPTOSTACHYS Hook. f.

Culm 30 cm. tall, slender. *Leaves* flat, long, shining. *Panicle* slender, flexuous, nodding, its branches whorled, short, capillary and few-flowered. *Floral glume* bearded below, bicuspidate, awned between the segments, the *awn* reflexed, twice as long as the spikelet. An elegant grass.

Magellan.

31. DANTHONIA DC.

Mostly perennials with flat or convolute *leaves* and contracted or open *panicles*. *Spikelets* 3–many-flowered, rachilla pubescent, extending beyond the 3–more flowers of the spikelet. *Empty glumes* subequal, keeled. *Floral glumes* rounded on back, 2-toothed, with a flat, twisted and bent median *awn*, the teeth sometimes awn-like. *Grain* free, enclosed in the glume.

Species 100, mostly in S. Afr. and in warm and temperate regions. (*D. antarctica* Desv. = *Deschampsia antarctica*.)

1. D. [illegible]ELLINA Phil.

Culms erect, glabrous, 3-nodal. *Leaves* and sheaths long-pilose, the radical convolute, setaceous, one third as long as the culm; sheaths of

the cauline leaves long, pilose-mouthed; upper ligules long; uppermost leaves short. *Panicle* contracted; spikelets 10–15. *Glumes* subequal, lanceolate-subulate, exceeding the flowers, yellow or slightly violaceous. *Floriglume* 10 mm., parted half-way, with long white hairs. *Awn* 12 mm.

Patagonia, elevated places near Bolson and Carren-leofú.

The Patagonian forms have the leaves and sheaths becoming glabrate with age, when young laxly and softly villous.

2. D. PICTA Nees & Mey.

Cespitose; *culms* erect, 6–30 cm. high, geniculate at the oblong, fulvous nodes. *Leaves* coriaceous, convolute, with pilose sheaths and short ligules. *Panicle* few-flowered, strict, to 4 cm. long, pointed: *spikelets* 9–10 mm., 3–4-flowered. *Empty glumes* lance-linear, 3-nerved, white with purple tips. *Floral glume* oval-elliptical, with setæ and *awn* in a triple cincture of hairs.

(Chili); S. Patagon., by R. Sta. Cruz, and Lago Argentino.

"Specimens from Sta. Cruz have yellowish-green glumes: from Lago Argentino are painted purple or violet." (Speg.)

3. D. PICTA PATAGONICA Speg.

Smaller than the species; *leaves* convolute-subulate, subpungent. *Spikelets* 3-flowered, *glumes* green, scarcely violascent; *awns* scarcely as long as their glumes.

S. Patagon., dry rocky places between S. Julian and Rio Deseado.

32. SPARTINA Schreb. Marsh-grass.

Glabrous with long rhizomes, flat, involute *leaves*, and alternate 1-sided *spikes*. *Spikelets* 1-flowered, in two rows, articulated below the glumes. The 2 empty glumes unequal, keeled; palea mostly longer than the floral glume.

Species 7, in saline soil or marshes.

1. S. CILIATA Kunth.

Leaves convolute-filiform. *Spikes* numerous, closely appressed. Keels of the *glumes* ciliate; *keel* of floral glume spinulose.

A tall wiry grass used for thatching about Bahia Blanca.

N. Patagon. (J. Ball).

2. S. DENSIFLORA Brongn.

Spikes cylindrical, subfusiform. Branches on all sides imbricate, appressed. *Spikelets* lanceolate, coriaceous, glabrous, lucid. *Keels* denticulate.

(Chili); Patagon.

3. S. PATAGONICA Speg.

Densely cespitose, glabrous. *Culms* leafy to the top. *Leaves* distichous, erect, their limb short, convolute, obtusely acute; sheath very long, close; ligule very short, ciliolate. *Spikes* secund, laterally compressed; rachis glabrous, dorsally channeled, with 8–12 spikelets, which are distichously unilateral, compressed and imbricate. *Lower glume* 2–3 times shorter than the upper, and narrower; the upper equalling the flower; palea glabrous, the inner finely membranaceous.

S. Patagon., at mouth of Rio Sta. Cruz. 40–70 cm. high.

33. CAPRIOLA Adans. (*Cynodon* Pers.)

Perennial grasses with short flat *leaves*, and *flowers* in digitately arranged *spikes*. *Spikelets* 1-flowered, secund. *Glumes* 3, the floriglume broadest and compressed; *palea* shorter, 2-keeled. *Stamens* 3; *styles* distinct. *Grain* free.

Species 4, 3 Australian, and 1 cosmopolitan in warm countries.

C. DACTYLON (Linn.) O. Ktze. Bermuda-grass.

Culms 1–3 dm. tall, erect, glabrous; *sheaths* crowded at base or on the stolons. *Leaves* flat, rough on upper surface. *Spikes* 4–5, rachis flat. *Floriglume* broad and much compressed.

(Eur., U. S. from N. Y. southwards.) N. Patagon., near Rio Colorado.

34. CHLORIS Swartz.

Leaves flat; *spikes* 1–many, often in pairs or digitate; *spikelets* in 2 rows on one side of the rachis, articulated above the empty glumes, which are unequal, keeled, acute; *floral glumes* awned, the lowest enclosing a perfect flower, at length enclosing the free grain. (Fig. in Brit. & Br. i, 178.)

1. C. PETRÆA Thurb.

Culm simple, erect, 30–60 cm. tall, glabrous, leafless. *Leaves* subdistichous, linear, serrulate, ciliate, their sheaths equitant, compressed.

Spikes 4–7, fasciculate, strict. *Flowers* 2, the upper setigerous below the apex; *floral glume* setigerous, ciliolate.

(Trop. Amer.); N. Patagon.

2. C. RADIATA Sw. (*C. beyrichiana* Kth.)

Culm creeping, branching, compressed; *leaves* scabrous, margined. *Spikes* 6–8, digitate, rachides flattish. *Spikelets* 2-flowered, the upper flower degenerate, 1-awned. The *glumes* lance-subulate; floral glumes long-awned.

(Trop. Amer.); N. Patagon.

35. TRICHLORIS Fourn.

Tall perennials with flat leaves. Spikes numerous, slender, sessile on the peduncle, subverticillate, forming a dense panicle, which is oblong and echinate by very many dense awns. Spikelets slender, erect, 1-, rarely 2-flowered, sessile along the continuous rachis of the unilateral spikes, 2-seriately crowded; rachilla articulated above the lower glumes, produced beyond the flower and glumiferous. Empty glumes 2, small, the second awned; the floriglume 3-awned, its awns long, straight. Superior empty glumes various, some 3-awned, others reduced.

Species 4–5, Mexico to S. Amer.

a. Flower of spikelet 1, hermaphrodite, and 2 or 1 sterile flowers. Awns of fertile floral glume 3, subequal.	
b. Neuter flowers 2.	*mendocina* (type).
*b*2. Neuter flower 1.	*mendocina blanchardiana*.
*a*2. 2 flowers of spike hermaphrodite, and 3 sterile; mid awn larger.	*pluriflora*, of Texas, Mex., Argentina.

T. MENDOCINA BLANCHARDIANA (Gay) Kurtz. (Scribner's description of *T. blanchardiana*.)

Culm stout, leafy, 60 cm. tall. Sheaths compressed, keeled, hairy on edges, especially near the throat; upper surface of the conduplicate leaf hairy near the base. Spikes slender, 12 or more, 7–10 cm. long, in a terminal panicle. Spikes 1-flowered, flower 3-awned, hermaphrodite; also a stiped 3-awned rudiment, occasionally 2 rudiments.

N. Patagon. Common by RR. Colorado and Negro.

36. BOUTELOUA Lag.

Spikes 1-sided, ultimately drooping. Spikelets in 2 rows on the rachis, 1–2-flowered, the rachilla prolonged, bearing bristles or rudimentary flowers. The 2 lower empty glumes acute, keeled; the floral glume 3-toothed; palea narrow, entire or 2-toothed; stamens reddish. Upper empty glumes 3–5-awned or divided. Grain oblong, enclosed but free.

Species 30, chiefly in Mex. and S. W. United States.

B. oligostachya (Nutt.) Torr. is the Grama-grass of U. S. prairies; *B. hirsuta* Lag., hairy Mesquite-grass.

B. MEGAPOTAMICA (Spr.) O. Ktze. (*B. multiseta* Gris.)

Cespitose; culms creeping, ascending, jointed, simple, 30 cm. tall. Leaves linear, narrowing subulate at top, the margins rough, glaucous above; their sheaths cleft, glabrous, and ligules short ciliate. Spikes 3–4, racemose. Spikelets 4–5-flowered, silky at base; lower flower 3-awned, densely pilose; the others with one glume and 9–11 fascicled awns.

(Brazil; Argentina.) N. Patagon. along Rio Negro, near Carmen.

37. TETRAPOGON Desf. (*Cryptochloris* Benth.)

Small grasses, with dense simple *spike* half enclosed within a spathe-like *bract*. *Spikelets* with 1–2–3 flowers, silky. *Lower glumes* very narrow, acute, awnless; several upper empty glumes smaller and awned; *floral glume* awned, the *awn* terminal between 2 obtuse lobes, mostly silky. Floral glume and grain falling away together.

Species 6, chiefly African; 1 in Patagon.

T. SPATHACEUS (Benth.).

Annual grass, scarcely 5 cm. high; *stems* below the inflorescence, 12–25 mm. *Leaves* few, laxly sheathing, the blades linear. *Bract* large, spathe-like, 16–20 mm. long, nearly enclosing the sessile, continuous, subsecund *spike*, which is quasi-plumose from the *setæ* and *awns* of the 2-flowered, biseriately crowded *spikelets*.

S. Patagon., by Rio Sta. Cruz. "My specimens hardly differ from the description by the palea being awnless and attenuate-mucronate." (Speg.)

38. PAPPOPHORUM Schreb.

Cespitose grass, with narrow, often convolute *leaves*, and dense spiciform *panicle*, with many *awns* often silk-like. *Spikelets* 1–2-, rarely 3–4-

flowered, narrow, with a joint above the lower glumes, the uppermost flower often male. *Empty glumes* 2, carinate; *floriglume* broad at base, obscurely many-nerved, divided into many *awn-like lobes;* 2–3 upper glumes empty or with a rudiment. *Palea* broad, 2-carinate. Grain enclosed in the palea and floriglume, free.

Species 20, in warm countries.

P. MUCRONULATUM Nees.

Culm branching. *Leaves* attenuate-acuminate, convolute, glabrous as are the sheaths. *Panicle* spicate, narrow, long, cernuous; *spikelets* nearly 4-flowered. *Glumes* subequal, oblong, membranaceous, setaceous-mucronate, 1-nerved; 2 (rarely 3) lower flowers perfect. *Floriglume* subcoriaceous, silky-strigose, 4-cleft.

(Brazil); N. Patagon., not rare in dry places near Carmen, and at the mouths of Rio Negro.

39. PHRAGMITES Trin. (*Arundo* Beauv.)

Tall perennials, with large flat *blades*, and spikelets 2–many-flowered, in a large much-branched *panicle*, *rachilla* elongated and articulate between the flowers, and covered with long hairs. *Glumes* thin, keeled, pointed, the *floriglume* with a longer point, the *lowest flower* being male or abortive. (This last character distinguishes from *Arundo* Linn.)

Species 2, over warmer parts of both worlds, in wet places.

P. PHRAGMITES (Linn.) Karst.

Culms 2–3 m. high; *blades* often 3 cm. wide. *Panicle* 15–35 cm. long. *Spikelets* 3–5-flowered, 16 mm. long, the silky hairs as long as the flowers. *Glumes* with nerves anastomosing towards the apex. *Floriglume* 5-nerved, 12 mm. long.

(Cosmopolitan in N. Hemisphere and Australia); Chubut, in swamps, and near Carren-leofú. The Patagonian forms always have 3-flowered spikelets, the upper flower often reduced.

40. MONANTHOCHLOË Engelm.

Creeping or stoloniferous, with crowded distichous *leaves*, less than 1 cm. long. *Spikelets* unisexual, almost immersed in leafy bracts. *Empty glumes* like the leaves. *Floriglume* obtuse or toothed. *Stamens* 3.

Styles distinct. *Grain* subtriquetrous, enclosed in the palea, not adherent.

Species about 2, in southern U. S. and S. Amer.

M. AUSTRALIS Speg.

Densely pulvinate-cespitose; the short branches pectinately leafy. *Leaves* small, complicate, rigid, callous-pointed. *Spikes* acrogenous, subsessile, compressed; with 2, rarely 3 flowers; often with a produced glumiferous rachilla; *floriglume* subcarinate; *palea* bicarinate, all glabrous. (Only the male specimens known.)

S. Patagon., dry salinas between S. Julian and Rio Deseado.

41. GYNERIUM Humb. & Bonpl. Pampas-grass. (*Cortaderia* Stapf.)

Tall, tubular grasses, often with *woody base*. *Leaves* very long, narrow, crowded at the base; ligules a line of hairs. *Panicle* ample, dense, becoming lax and nodding, silvery or dark. *Spikelets* 3–7-flowered, diœcious, *rachilla* longish, articulate in both sexes, with long hairs arising from the membranaceous or thin narrow *glumes*. *Empty glumes* as long as the spikelet, scarcely equal, 1–3-nerved or nearly nerveless, acuminate. *Floral glumes* 3-nerved, the mid pointed and produced as an *awn*, mostly glabrous in the male, long-pilose in the female. *Stamens* 3 in the male flowers, also rudiments in the female, and rudimentary ovary in the males. *Grain* narrowly oblong, free within the glume and palea.

Species 5, in extratrop. S. Am. and along the Andes northwards.

1. G. ARGENTEUM Nees. (*Cortaderia dioica* Speg.) Pampas-grass.

3–6 m. tall. *Leaves* 1–3 m., gracefully pendent. *Panicles* 30–60 cm. long, 10–15 cm. broad, the *males* broad-pyramidal, the *females* long-linear, beautifully silvery or pinkish. *Floral glumes* of the male flowers scarcely awned. (Fig. in Eng. & Pr. ii, 2, p. 67.)

(Cult. in lawns; Brazil; Argent.); N. Patagon., Patagon., near source of Rio Chico; Nahual-huapi.

2. G. PILOSUM (d'Urv. sub *Arundo Cortaderia pilosa* Hack.).

Panicle contracted, subovate. *Empty glumes* smooth, carinate, acute, as long as the spikelet. *Floral glumes* copiously girt with long, white villi. *Leaves* striate, distichous, mostly exceeding the culm. *Panicle* contracted, subovate. *Glumes* violaceous, scarious-margined. *Empty*

glumes smooth, carinate, acute, as long as the 5-flowered spikelet. *Floral glumes* smooth with long, white villi.

This with *Sieglingia antarctica* and *Festuca erecta* make a cespitose and tenaceous mass, 3 dm. deep, covering half of the Falkland Islands. Patagonia, by Lago Maravilla.

"Rachilla pilose." (F. Kurtz.)

42. SIEGLINGIA Bernh. (*Triodia* R. Br.)

Leaves narrow, and *panicles* contracted or open. *Spikelets* having 2 to several flowers, all perfect or the upper staminate. *Glumes* 5–many, the lowest 2 empty, shorter than the spikelets, keeled; the *floral glumes* not keeled, their 3 nerves pilose and excurrent as points. *Styles* short. *Grain* dorsally compressed, enclosed but free.

Species 30, in temperate regions; also in trop. Amer., Afr. and Austral.

S. ANTARCTICA (Hook. f.).

Small, densely cespitose, very leafy, glabrous; *leaves* not rigid, nearly equalling the culm, long-sheathed, setaceous, the margins involute. *Panicle* spike-like; *spikelets* short-pediceled, 3-flowered; glumes subequal, lanceolate; *floral glume* broad-ovate, 5-nerved, acute, minutely *trifid*. See note on *Gynerium pilosum*.

Magell., Fuegia, Mts. of Hermite I., Falkland Is.

43. DIPLACHNE Beauv. (or sub *Leptochloa*).

Cespitose, mostly tall, with narrow, plane *leaves*, and very slender *spikes*, erect on a long axis, or rarely 1 terminal spike. *Spikelets* mostly linear along the rachis, erect, subsecund, many-flowered, sessile or nearly so, their rachilla articulate above the lower glumes. *Flowers* hermaphrodite, or the uppermost male. *Empty glumes* 2, carinate, unequal, 1-nerved, not awned. *Floral glume* slightly larger, 1–3-nerved, 2-toothed, with a short median *awn*. *Grain* enclosed but free.

Species 14, in warm climates.

D. MENDOCINA (Phil. sub. *Ipnum*).

Panicled spikes numerous, spreading with an open angle. *Spikelets* many-flowered, distichous along the rachis. *Rachilla* articulate between the flowers. Lower *empty glume* lanceolate, upper ovate, larger. *Floral*

glume dorsally compressed, 3-nerved, shortly mucronate, hyaline towards its apex. *Palea* ovate.

(Argentina); Patagon.

44. ERAGROSTIS Beauv.

Spikelets flat, usually many-flowered (rarely 2-flowered), the *flowers* perfect or variously unisexual; *panicle* contracted or open. *Glumes* short, unequal, keeled, 1–3-nerved; *floral glumes* larger, unawned, 3-nerved; palea shorter, prominently 2-nerved. *Stamens* 2 or 3. *Grain* not furrowed, enclosed, free. (Like *Poa*, but differing by the 3-nerved floral glumes.)

Species 100, in temperate and warm climates.

1. E. DELICATULA Trin.

Culm erect, slender, 12–25 cm. tall, floriferous and branching from base. *Leaves* plane, glabrous, their ligules ciliate-bearded. *Panicle* spreading, its rays 1–2, rarely more, mostly compound from the base. *Spikelets* as long as the pedicels, linear-elliptical, 3–6-flowered.

(Bahia Blanca); N. Patagon. "Good pasture in the valleys." (J. Ball.)

2. E. ERAGROSTIS (Linn. sub *Poa*) Karst.

Annual, 10–25 cm. high. *Leaves* flat, smooth, scent-glands on their margins and the glumes. *Panicle* ovoid or linear, rather dense. *Spikelets* compressed, on short pedicels, oblong-linear, plumbeous, 8–20-flowered. *Floriglume* broad-oval, obtuse; *palea* ciliated on the nerves. *Grain* ovoid.

(Europe, introduced to Amer.); N. Patagon. in cultivated places near Carmen.

3. E. LUGENS Nees.

Tufted perennial, 45 cm. high. *Sheaths* of sterile sheets compressed, keeled, hairy. *Ligule* a ciliate ring; blades ciliate, with filiform points. *Panicle* thin, narrow or ovoid, 30 cm. long. Rays in 2's or 4's, with hairy axils, branching. *Spikelets* oval, 4–8-flowered. *Glumes* ovate, acute, floriglume broader, *palea* incurved.

(Texas, etc.); N. Patagon., common near Carmen.

4. E. MAJOR Host. (*E. poæoides major* Beauv.)

Cespitose, branching, 15–60 cm. tall. *Leaves* lanceolate, glabrous, their sheaths bearded at the opening. *Panicle* spreading, the rays solitary

or in pairs. *Spikelets* elliptic-linear, large, 8–50-flowered; the *flowers* broad-ovate, mostly mucronulate. (Leaf-nerves with glands which emit an offensive odor.)

(Cosmopolitan); a dwarf form in N. Patagon.

45. KOELERIA Pers.

Cespitose, with contracted *panicles*. *Spikelets* mostly 2–5-flowered. The two lower *empty glumes* keeled, acute or short-awned, scarious-margined; *floral glumes* similar but more scarious; the upper glumes gradually smaller, 3–5-nerved.

Species 15, dispersed over temperate regions; several species in Chili and Argent. Distinguished chiefly by more scarious glumes and fainter nerves than of their allies.

1. K. PHLEOIDES Pers.

Culm ascending, geniculate, 7–30 cm. high. *Leaves* plane, narrow, linear, hairy; ligule white-scarious, partly exsert, lacerous. *Panicle* dense, cylindrical, spike-like; *spikelets* 2–8-flowered. *Glumes* unequal, shorter than the flowers. *Floriglume* dorsally scabrous, subapically awned; the *awn* exceeding the flower. Annual.

N. Patagon., roadsides near Carmen.

2. K. STERILIS Steud.

Culms 5–15 cm. high, with the leaves fasciculately crowded, having basal sheaths. *Leaves* glabrous, linear, nearly as long as the culms, the margin inflected; the ligules oblong, exsert. *Spike* terminal, solitary; the rays with 2–6 *spikelets*, which are lanceolate, 3–4-flowered. *Glumes* subequal, nearly as long as the flowers, white hyaline on margin and apex.

Patagon.

46. CATABROSA Beauv. Whorl-grass.

Creeping perennial aquatic, with soft flat *leaves* and open *panicle*. *Spikelets* 2-flowered, the two empty *glumes* nearly nerveless, shorter than the *awnless*, erose-truncate floral-glume; palea barely shorter.

Species 1, viz.:

C. AQUATICA Beauv.

Culm 10–60 cm. tall, stout. *Spikelets* 3 mm. long, the second empty glume exceeding the first. (Brit. & Br. i, 194. In cold parts of Eurasia and N. Amer.) E. Fuegia.

47. MELICA Linn.

Erect perennials, often with corms, and usually soft flat *leaves*. *Panicle* contracted or lax; *spikelets* 2–several-flowered; their rachilla produced and bearing rudimentary flowers. *Empty glumes* 2, awnless, 3–5- or more-nerved; *flowering-glumes* larger, rounded, 7–13-nerved, sometimes terminally awned. *Paleæ* broad but shorter. *Grain* oblong, dorsally flattened, enclosed but free.

Species 30, in temperate regions (not known in Austral.).

1. M. MACRA Nees.

Erect, over 60 cm. tall, slender; *leaves* strict, very rough, the lower linear-plicate, the upper plane, 12 cm. by 2 mm. *Panicle* compound, secund, its rays racemose. *Spikelet* 3-flowered, lanceolate, nodding. *Glumes* subequal, oblong, convolute, 5- and 7-nerved.

(Montevideo and about Bahia Blanca; the *pasto-bravo*, or wicked grass. J. Ball.) N. Patagon.

(*M. magellanica* Desv. = *Hierochloë redolens.*)

2. M. PAPILIONACEA Linn.

Panicle virgate. Pedicels slender, branching below, longer than the spikelets. *Lower glume* very large, colored, obovate, obtuse, much exceeding the upper. *Flowers* 2 and a rudiment; *floral glume* oblong, 16-nerved, apex scarious-colored.

(Brazil); N. Patagon.

3. M. VIOLACEA Cav.

Rhizome bulbiferous. *Culms* flagelliform, branching, 15–60 cm. tall. *Panicle* linear, rigid, 5–20 cm. long, with 1–7 unilateral appressed branches; *spikelets* 2-flowered with 1 or 2 imperfect flowers. Lowest *glume* the largest, obovate-rounded, 8–10 mm. long, violet, apex whitish; the upper shorter and narrow.

(Common about Bahia Blanca.) N. Patagon. "*Nahuel-Catschu*, the Araucanian name, refers to the puma crouching in it." (J. Ball.)

48. DISTICHLIS Raf.

Creeping grass with rigid convolute *leaves* and diœcious *flowers;* mostly maritime. *Spikelets* compressed, 6–16-flowered, in a narrow *panicle*, sometimes with only 2 or 3 spikelets. *Rachilla* glabrous, articulate be-

tween the female flowers only. *Glumes* all keeled and acute; the floral broadest; *palea* with prominent keels.

Species 4, America; 1 of them also in Australia.

1. D. SCOPARIA (Kunth, sub *Poa*) Arech.

Culms fasciculately branching, the branches subfastigiate, leafy. *Leaves* narrowly linear, convolute-setaceous, acute-pungent, rigid, with glabrous sheaths. *Female spikelets* 3–5, branching, oblong, acute, compressed, 5–6-flowered, glabrous. Flowers not bearded. *Floral glume* about 1-nerved.

(Montevideo); S. Patagon., by Rio Chico.

2. D. SPICATA (Linn.) Greene.

Glabrous, 60 cm. tall. *Sheaths* long, overlapping; ligules a ring of hairs. *Panicle* dense, strict. Much varying.

(N. Amer. and S. Amer.; also Austral. Brit. & Br. i, 198.) N. Patagon., on sandy and saline soil. "Granilla de salistral." (J. Ball.)

D. SPICATA HIRTA (Phil.) O. Ktze.

Hairy, at least the lower leaf-sheaths.

Patagonia.

49. BRIZA Linn.

Panicle usually open. *Leaves* flat or convolute. *Spikelets* large, flat, tumid, usually many-flowered, nodding. *Glumes* strongly concave. *Floral glumes* broader; uppermost often empty. *Paleæ* much shorter.

Species 12, Old World, and temperate S. Amer.

1. B. SUBARISTATA Lam. (*B. lamarckiana* Nees. *Festuca commersonii* Spreng.)

Like *B. triloba*, but taller, 22 cm., and with orbiculate-cuspidate *floral glume*. *Spikelets* elliptic-ovate, about 11-flowered. *Panicles* erect, 25 mm. long, contracted; its rays sub-binate, 1-spiculate.

(Montevideo); N. Patagon. (?)

2. B. TRILOBA (Nees).

(*Calotheca*, *glumes* awned, *floral glumes* with projecting lateral angles.) *Culm* low, about 15 cm., simple. *Leaves* erect, convolute, rough; ligules short. *Panicle* rather contracted, its rays 3-parted. *Spikelets* subtetrag-

onal, 6–12-flowered. *Floral glumes* 3-lobed, the mid-lobe long, 9-nerved. (Brazil); N. Patagon.

50. PANICULARIA Fabr. (*Glyceria* R. Br.)

Leaves flat or involute, and *panicle* narrow or spreading. *Spikelets* few- or many-flowered; the *empty glumes* 3–5-nerved; the *floral glumes* 3–9-nerved, longer, obtuse, convex or dorsally flat, the nerves short; *palea* as long as its glume; no awns. Grain grooved, glabrous, enclosed but free. Leaves mostly glabrous (except *P. fluitans*).

Species 30, in temperate and some warm regions. *P. fluitans* R. Br. extends through the N. temperate parts of both hemispheres, and Australia. (Brit. & Br. i, 213.)

1. P. ANTARCTICA (Speg.).

Creeping, glabrous. *Culms* sheathed above the mud, the sheaths loose. *Leaves* few, plane, the lower floating, the ligules long-triangular. *Panicle* exsert, very lax; the rays whorled, remote, bearing few spikelets; these ovate, 2-flowered, compressed; lower *glume* half as long as the upper. Base of flower with a few long hairs.

Staaten I. and S. Fuegia.

2. P. FLUITANS (L.) Kuntze. Floating Manna-grass.

Culms a meter high or more, flattened, stout. *Sheaths* loose. *Leaves* 12–30 cm. long, wide, scabrous, often floating. *Panicle* about 30 cm. long, rather appressed. *Spikelets* linear, 7–13-flowered; *glumes* unequal, 1-nerved; the *floriglume* scabrous, 7-nerved, its apex erose.

(Eur. and N. Amer. by water); Patagon., by Lago Colu-huapi and Rio Carren-leofú.

3. P. FUEGIANA (Speg.).

Creeping, glabrous; *culms* sheathed to top, the sheaths large, striate; *leaves* few, flaccid, erect, the lower sometimes floating; their blades plane, linear, acute; ligules exsert, ovate, toothed. *Panicle* long, exserted from the sheath, at first linear, afterwards lax; *spikelets* remote, peduncled, linear, 3-flowered; *glumes* glabrous, the lower obtuse, the upper acute and twice as long.

Magellan, by fresh water, near Gregory Bay.

4. P. LEPTOSTACHYS (Speg.).

Small, cespitose, glabrous. *Culms* not sheathed, simple. *Leaves* fasciculate, erect, very short, the ligules lanceolate. *Spike* linear, few-spiculate; *spikelets* minute, remote, sessile, 3-flowered. *Glumes* unequal.

Magell.

5. P. MAGELLANICA (Hook. f.).

Glabrous, with *culm* erect and covered by the leaf sheaths, which are longer than the involute leaf blades. *Panicle* long, lax; its rays in flower apically elongated. Spikelets 4–6-flowered; *glumes* apically eroded; *floral glumes* 5-nerved.

S. Patagon., by R. Sta. Cruz; Magell., in wet meadows by Gregory Bay.

51. ATROPIS Ruprecht.

Panicle at length contracted. *Spikelets* 2–9-flowered. *Empty glumes* 3-nerved, or the first 1-nerved, much shorter than the flowers; *floral glumes* chartaceous or scarious, convex or slightly keeled, obscurely parallel 5-nerved, midnerve sometimes produced, the side nerves short; *palea* with convergent ciliolate nerves, 2-toothed. *Stigmas* subsessile. *Grain* obcompressed, enclosed but free.

Species 14, in all temperate regions.

1. A. CARINATA Griseb.

Cespitose, glabrous, 10 cm. high. *Leaves* involute, acuminate, rigid, their sheath lax below, their ligules long. *Panicle* ovate-oblong, the rachis sulcate on one side. *Spikelets* oblong, 4–5-flowered; *floral glume* silky below, 2-toothed above with a median mucro.

(Paraguay; Argentina); N. Patagon.

2. A. MAGELLANICA Hook. f.

Glabrous, 30 cm. tall; *leaves* involute; ligules ovate-acute; sheaths lax. *Panicle* 15 cm. long, its rays long, slender. *Spikelets* oblong, 4–6-flowered, 8–12 mm. long, the *flowers* distant, cylindraceous; *floral glume* narrow, 4 mm. long, attenuate to an obtuse spike, glabrous except the pilose callus; *palea* as long.

"Differs from *A. parviflora* by *flowers* twice as large, *keels* of the palea spinulose, ciliate the whole way, *panicle* lax, branches naked in the lower two thirds, and its simple spiculiferous *branching*." (Dusén.)

E. Fuegia.

3. A. PARVIFLORA Hackel.

Cespitose; *culms* erect, 4–8 cm. high (besides the panicle), glabrous, having 1–2 nodes near the base. *Leaf-sheaths* lax, the upper one long, embracing the panicle; ligules 1.5 mm., linear-oblong; the *laminæ* short, 15–20 mm., convolute-setaceous. *Panicle* 8–10 cm. long, ovate, spreading, compound, the branches rough. *Spikelets* linear, 3–5-flowered, 5–6 mm. long; *empty glumes* unequal, ovate-oblong, obtuse; the lower 1-nerved, 1 mm. long, the upper 3-nerved and longer; *floral glume* 2 mm. long, 5-nerved. *Palea* as long, 2-toothed, the keels scabrid above.

E. Fuegia (Dusén).

4. A. PRESLII Hack. (*Catabrosa tenuifolia* Presl.)

Cespitose; *culms* erect, 10–12 cm. high, glabrous. *Leaves* narrow-linear, canaliculate, rough, shorter than the culm; ligule exsert, ovate, acute. *Panicle* spike-like, erect, its rays alternate, fasciculate, rough. *Spikelets* ovate, 3-flowered, *glumes* unequal, ovate, obtuse, the upper twice as large as the lower, and 3-nerved; the *floral glume* ovate-obtuse, erose, 5-nerved, the lateral nerves becoming obsolete.

(Chili.)

5. A. PRESLII PUSILLA Hack.

Forming dense *cushions* 3–4 cm. high. *Leaves* convolute, subcapillary, 1–2.5 cm. long. *Panicle* linear, 2–4 cm. long. *Spikelets* subterminal and subsessile on the ultimate branchlets, small, 3 mm. long, red-violet. *Empty glumes* small, the lower 0.8 mm. long, nerveless; the second twice as long, obscurely 1-nerved; the *floral glume* ovate, 1.5 mm. long, entire; *palea* as long, lanceolate.

N. and E. Fuegia (Dusén).

52. POA Linn. Meadow-grass.

Leaves and panicles various. *Spikelets* of medium size, usually 2–6-flowered, the *rachilla* glabrous and articulate between the floral glumes; *floral glumes* scarious margined, with 5-connivent nerves, mostly web-tufted at base. *Paleæ* slightly shorter.

Species 100, in temperate and cold regions; rare in the tropics; many in the Andes.

KEY TO THE SPECIES.

A. Leaves glabrous.

b. Panicle contracted.

c. Leaves as long as the culm.

d. Culm tall, 1 meter. Sheaths long. Spikelets 6–8-flowered. Glumes woolly at base. *alopecurus.*

*d*2. Culm 80 cm. Leaves filiform. Spikelets 3-flowered. Glumes subvillous. *bonariensis.*

*d*3. Culm 30 cm., shorter than the convolute leaves. Ligules long; sheaths dilated. Awn short. *controversa.*

*d*4. Culms in clumps, 1 meter; lower leaves taller, subconvolute. Panicle spike-like. Spikelets 4-flowered. Floriglume bifid, mucronate-awned. *forsteri.*

*c*2. Leaves shorter than culms, sheaths overlapping Annuals or biennials, under 30 cm. Spikelets 3–7-flowered.

d. Cauline leaves 3, flat or conduplicate, abruptly acute; ligules 2.5 mm. Spikelets 3–7-flowered. *annua.*

*d*2. Leaves convolute. Ligules obsolete. Spikelets 5–7-flowered. *denudata.*

*d*3. Leaves convolute-pungent. Ligules short, obtuse. Panicles spike-like. Spikelets crowded above, 2–4-flowered, amethystine. *robusta.*

*c*3. Leaves distichous, linear, rigid; ligules short. Panicle lobed; spikelets 2–5-flowered, the staminal effete. Culm 20 cm. Flowers woolly at base. *lanigera.*

*c*4. Leaves narrow or involute, with two yellow spots; ligules oblong. Culms 30 cm., from a creeping base. Spikelets 5–10-flowered, with subfloral tufts. *lanuginosa.*

*c*5. Leaves short. Culms 15 cm.

d. Culm 2-nodal below, with intravaginal innovations. Ligules 2 mm. Spikelets 3-flowered. Glumes and floriglume subequal, keeled. *atropidiformis.*

*d*2. Culm basally bulbiferous. Ligules long. Panicle few-spicate. Spikelets 2–3-flowered. Palea cuspidate-awned. *ibari.*

*c*6. Leaves convolute, attenuate-pungent. Dicœcious perennial. Spikelets 7–8-flowered, not villous. Culm 60 cm. *argentina.*

*c*7. As *c*6, but leaves pungent; floriglume woolly at base. *bergii.*

*c*8. Leaves short, stiff and pungent, mostly distichous. Culm smooth, erect, slender. Spikes strict, secund.

d. Leaves subterete. Spikelets 2-flowered, the upper flower male. *erinacea.*

*d*2. Leaves very conduplicate. Spikelets 2-flowered, both perfect, often with a rudiment of a third. *pugionifolia.*

*c*9. Leaves very long, acute, smooth. Panicle long, rays rough. Spikelets 12-flowered, pale yellow. Culm 60 cm. *pallens.*

*b*2. Panicle lax. Leaves sheathing; with long ligules.

c. Low, 6 cm. Leaves rigid, convolute. Spikelets few, 3-flowered. Glume and rachis glabrous. *pumila.*

*c*2. Culm 60 cm., sheathed half way. Leaves distichous. Spikelets 4–6-flowered, cottony. *yaganica.*

*b*3. Panicle lax. Culms 2–3 meters tall. Leaves fan-shaped, gracefully diverging. *flabellata.*

*A*2. Leaf-margins rough; surface smooth. Panicles lax.
b. Culms to 25 cm. Leaves convolute. Spikelets large, 4–5-flowered, purplish, enclosed by woolly hairs. *commersoni.*
*b*2. Culms to 50 cm. Radical leaves narrow-linear. Spikelets few, 2–5 (8)-flowered, rachis flexuose. *stenantha.*
*A*3. Leaves scaberulous or sometimes glabrous.
b. Panicle pyramidal, dense above. Spikelets 3–6-flowered, purplish. Floriglume basally webby. Culm 40 cm. *pratensis.*
*b*2. Panicle mostly lax, 4–5-spiculate. Glumes acuminate. Upper flowers viviparous. Culm 50 cm., leafy at base. *fuegiana.*
*b*3. Panicle mostly contracted. Culms 35 cm.
c. Spikelets small, woolly. Leaves few, setaceous-convolute, the sheaths scaberulous. Panicle linear. *scaberula.*
*c*2. Spikelets 3-flowered, dicœcious. Leaves convolute, the lower flat (pubescent?). *chilensis.*
*A*4. Leaves scabrous. Culm 50 cm.
b. Panicle lax. Leaves acuminate. Spikelets 2–5-flowered, often violet. Floriglume basally webby. *nemoralis.*
*b*2. Panicle spike-like. Culm 3-nodal, exceeding the leaves. Leaves convolute, scabrous above. Ligules long, 2-partite. Spikelets long, 5–8-flowered *patagonica.*
*A*5. Leaves scabrid-edged, plicate, pungent. Dicœcious, with large, secund panicle, and spikelets 2-flowered. *chubutensis.*

1. P. ALOPECURUS Kunth. (*Festuca arundo* Hook. f.)

Large, reaching a meter in height; *leaves* glabrous, distichous, equalling the culm; sheaths long. *Panicle* ample, contracted. *Spikelets* glabrous, compressed, 6–8-flowered; *glumes* minutely ciliate on back and margin, floral glumes acute, dorsally ciliate, woolly at base. *Palea* minute.

Magellan; Falklands. Next to the *tussock*, it is the largest grass there; varying much in size of the plant, and of its leaves, spikelets, etc. It is harsh and rigid, and thus unpalatable to cattle.

2. P. ANNUA Linn.

Low annual or biennial, under 30 cm. *Leaf-sheaths* loose, overlapping. Ligules 2–3 mm. *Panicle* open, its rays spreading. *Glume* no. 1 narrow, 1-nerved; two thirds as long as the broad 3-nerved second; the *floral glume* not webby at base.

(Brit. & Br. i, 201. Eurasia; naturalized in N. Amer.) Punta Arenas; Ushuaia (Dusén); over S. Patagon.; S. Fuegia.

3. P. ARGENTINA Speg.

Diœcious, perennial, 50–70 cm. tall, glabrous, cespitose. *Leaves* erect, convolute, acute. *Ligule* narrow, margin-like. *Panicle* spiciform, strict. *Spikelets* 5–7 mm. long, pediceled, 7–8-flowered, not villous. *Glumes* appressed-pubescent.

S. Patagon., at Lago Argentino.

4. P. ATROPIDIFORMIS Hack.

Cespitose, with intravaginal innovations. *Culms* erect, 10–20 cm. high, smooth, 2-nodal near base. *Leaves* glabrous, their sheaths lax, striate; ligules 2 mm. long, ovate-lanceolate, the *blades* short, the uppermost 1 cm., narrow, convolute when dry. *Panicle* spike-like, 5–8 cm. long; lower rays with 4–6 spikelets, fewer above; *spikelets* 3-flowered, all perfect, glabrous, third flower protruding. *Glumes* all subequal, keel scabrid, except the floral glume whose keel is rather smooth and its lateral nerves obscure. *Palea* lanceolate, obtuse, as long as the glume.

E. Fuegia. (Dusén.) "This and *P. kerguelensis* Hook. f. and *Triodia antarctica* Hook. f. are allied as if they were a subgenus of *Poa*." (E. Hackel.)

5. P. BERGII Hieron.

Diœcious. Stout, *culms* 50 cm. high, smooth, rooting at base. *Leaves* exceeding the culms, their sheaths 20–25 cm. long, 7 mm. broad, smooth, *laminæ* 35–45 cm. long, convolute from their base, glaucous, rigid, acute, *pungent*, 4 mm. wide at base, dorsally glabrous, internally papillose; ligules long, hyaline, mostly lacerose. *Male panicle* compressed, spike-like, interrupted, 12 cm. long, the rays usually in 2's alternately appressed to the culm, pediceled and plurispiculate. *Female spikes* ovate, 6–7-flowered, pediceled, about 15 mm. long, 6 mm. broad. *Glumes* lanceolate, 8–9 mm. long, 3 mm. broad, acute, not exceeding the inferior flowers, subcarinate, dorsally rough on the midnerve, minutely ciliolate marginally, 7-nerved, the 2 marginal nerves being weaker and shorter than the others. *Floral glumes* 7–9-nerved, lance-ovate, acute, in the lower flowers 7 mm. by 2 mm., subcarinate baseward and finely ciliate on the nerves, with a basal girdle of floccose wool. *Paleæ* with 2 marginal nerves, ciliate upwards, woolly basewards. *Male* spikelets (?).

N. Patagon., by Rio Negro; December.

P. BERGII CHUBUTENSIS Speg.

Differs from the species by lower *stature*, 3-nerved *glumes*, 5(–7)-nerved *paleæ* and *spikelets* scarcely 9–11 mm. long.

N. Patagon., Chubut, common in dry meadows by Cabo Raso.

6. P. BONARIENSIS (Lam. sub *Festuca*) Kunth.

Culms slender, 60–90 cm. tall, weak, glabrous; *leaves* long, filiform, glaucescent, hairy at the opening of the sheaths. *Panicle* oblong, shining, its rays appressed. *Spikelets* compressed, 3-flowered; glumes acute, subvillous.

(Argentina); S. Patagon., N. and E. Fuegia. (Dusén.) In sandy places.

7. P. CHILENSIS Trin.

(*Dioicopoa. Diœcious*, but the sexes not otherwise differentiated.) *Root* fibrous, often stoloniferous. *Culm* 20–45 cm. tall. *Leaves* convolute, the lower plane, 25 cm., the ligules somewhat produced. *Panicle* compact or lobed, its rays in 3's or 5's, spiculiferous from the base. *Spikelets* 3-flowered, short-pediceled; *flowers* obscurely nerved, lanceolate, acutish. Puerto Madryn; (Chili).

8. P. CHUBUTENSIS Speg.

Diœcious. Robust, densely cespitose, green-glaucescent. *Leaves* plicate, with scabrid margins, callous-mucronate and pungent; ligules short, truncate, scarious. *Panicle* large, secund, at length nutant; rachis not scabrous; rays not scabrous, naked below, above their middle sparingly branching and densely spiculiferous. Pedicels short; *spikelets* 2-flowered, lanceolate; *glumes* obtusely keeled, not rough, 1- and 3-nerved. *Flowers* carinate, dorsally scabrid; lower floriglume 5-nerved, submucronate; *palea* as long, hyaline. *Squamulæ* rather large, basally villous, the upper with a short, smooth pedicel. (Only female specimens seen.)

Chubut, in rocky elevations near Teka-choique.

9. P. COMMERSONI Franchet.

Cespitose, glabrous. *Culms* to 30 cm. tall, erect, apex scabrid. *Leaves* convolute, strict, rough-margined, striate. Panicle crowded, oblong, with

short rays. *Spikelets* large, purplish, 4–5-flowered; the flowers enclosed by long woolly hairs. Glumes subequal, ciliate, mucronate, the lower 5–7-nerved; the *floral glume* like the others; the *palea* short, truncate.

A fine species, like *P. antarctica* Hook., approaching *Festuca*.

Magellan, "Freshwater Bay, named by me Duclos Bay." (Commerson, 1767.)

10. P. CONTROVERSA Steud.

Cespitiferous. *Culm* erect, glabrous; *leaves* rigid, convolute, smooth, pungent, 30 cm. long, their sheaths dilated; ligules long, cleft. *Panicle* contracted, its rays subverticillate, many-spiculate. *Spikelets* ovate, 5-flowered, the flowers alternate, remote. *Glumes* lanceolate, scarcely equalling the first flower; *floral glume* 2-toothed with a short *awn* between.

Patagon. and Fuegia (Speg.); Falklands.

11. P. DENUDATA Steud.

Roots fibrous, cespitiferous. *Culms* erect, strict or basally jointed, smooth, striate, 30 cm. high, sheaths glabrous, striate. Ligule nearly wanting. *Leaves* terete-convolute, smooth, not exceeding the culm. *Panicle* very long-exserted, contracted, with semi-whorled rays, shorter at the base. *Spikelets* 5–7-flowered, flowers green to white, varied. *Glumes* ovate-lanceolate, equalling the lowest flowers. *Floral glume* acute with rough keel.

N. W. Patagon., Valdivia.

P. DENUDATA MINOR.

12. P. ERINACEA Speg.

Hermaphrodite or polygamous, densely cespitose; sterile and fertile *fascicles* often crowded and monostichously imbricated, all similar. *Leaves* mostly distichous, glabrous. Sheaths broad, close, minutely 2-auricled. *Laminæ* subterete, short, rigid, very sharply pungent-mucronate. *Culms* smooth, erect, slender, naked or 1-leaved. *Spike* strict, erect, secund, its nodes 2–3-pedicelliferous. *Pedicels* short, scabrid. *Spikelets* compressed, often 2-flowered, the lower flower perfect, the upper male, both glabrous; glumes awnless.

Chubut, in dry salinas. Forming hemispherical masses, 10–25 cm. diam.

13. P. FLABELLATA Hook. Tussock-grass. (*Dactylis cæs.* Forst., *Poa cæspitosa* H. nec Forst.)

Gigantic grasses with fan-shaped *leaves*, spreading out like young palm-trees. Fig. 40.

Falklands; Staaten I.; Magellan and Fuegia to Cape Horn; Elizabeth I.; Bonner Bay on Picton I., at entrance to Beagle Chan.; (also in Kerguelen I.).

FIG. 40.

Poa flabellata, tussock-grass. Roots of leaves reduced, and spikelets. (After *Flora antarctica.*)

Gregarious; valuable as fodder and forming peat; extending over long patches near the seashore in the Falkland Islands, where it is most abundant and luxuriant. Gov. Moody wrote of its "sweet nutty-flavored roots. Cattle scent it from a distance and use every effort to get at it. They will eat the dry tussock-thatch off the roof of a house in winter." "Strange that they flourished where there was no herbivorous animal to use them." Discovered by Commerson in 1767. American sealers lived on the nut-like core of the bases of their culms for 14 months.

14. P. FORSTERI Steud.

Cespitiferous, in small clumps; *culms* numerous, to 1 meter high, glabrous, compressed, leafy; lower *leaves* higher than the culms, 25 mm. broad at base, upwards with involute margin; ligules slender, rounded. *Panicle* interrupted-spike-like, 15–20 cm. by 3–4 mm. *Spikelets* broad-ovate, 4-flowered; *glumes* lance-acuminate, longer than the flowers, the margins involute; *floral glume* bifid and mucronate-awned.

Magellan.

15. P. FUEGIANA (Hook. f. sub *Festuca*) Hack.

Culms erect, 50 cm. tall, leafy especially at base, scaberulous or glabrous. *Panicle* effuse or slightly contracted. *Glumes* ovate-lanceolate, acuminate, subcarinate, *floral glume* puberulous, dorsally silky on the nerves; *flowers* short-pedicelled, webby at base, the upper viviparous. *Palea* bifid, as long as its glume.

A very handsome species retained in *Festuca* by J. D. Hooker on account of its acuminate scales; but with "fertile glumes acutely carinate, silky-pubescent on the keel and at the prominent marginal nerves; just as in *Poa*." (Dusén.)

Magell.; Fuegia to Cape Horn; Sta. Cruz Valley. (J. B. Hatcher.)

16. P. IBARI Phil.

Cespitose, glabrous, bulbously thickened at base, covered by white sheaths of dead leaves. Fertile *culm* 15 cm. high; *leaves* coriaceous, convolute-setaceous, much shorter than the culm; the ligules very long. *Panicle* contracted, few-spiculate, 4 cm. long. *Spikelets* 9 mm. long, 2–3-flowered. *Floral glume* of male flowers 7.5 mm. long, 3-nerved at base, usually cuspidate awned, with scabrid keel, basally woolly as on lateral nerves. Joints of rachis penicillate at base.

By Lago Pinto, S. Patagon.

17. P. LANIGERA Nees.

Culm simple, scarcely 30 cm. high, with compressed, carinate, glabrous sheaths. Ligule short, rounded or truncate, *leaves* distichous, linear, rigid, plane. *Panicle* branching, contracted, lobed. *Spikelets* 2–5-flowered, all the staminal effete. *Flowers* very long-woolly at base. Lower *floral glume* 5-nerved, densely silky-ciliate on back and margin.

(Brazil; Chili); Patagon. (?).

18. P. LANUGINOSA Poir.

(*Dioicopoa* see *P. chilensis*.)

Creeping; culm simple, 30 cm. tall, with 2 nodes, subcompressed. *Leaves* narrow-linear, becoming involute, a yellow spot at each side near the glabrous sheath; the ligules oblong, lacerate. *Panicle* contracted, its short, solitary rays fasciculately divided. *Spikelets* ovate, 5–10-flowered, imbricate on the raylets; *floral glume* silky-keeled, with a tuft of long hairs on the axis under each flower.

S. Patagon. by R. Sta. Cruz; E. Fuegia. (Dusén.) "Identification uncertain; perhaps a var." (E. Hackel.) Chubut, "not rare in dry places by Cabo Raso," var. *elata* Speg.

19. P. MAGELLANICA Phil.

Female specimens in the Spegazzinian Herbarium are identical with *P. patagonica* Ph.

Magellan (Spegazzini); Fuegia.

20. P. NEMORALIS Linn.

Culms erect, 50 cm. tall, slender, glabrous. *Leaves* 7 cm. long, 2 mm. wide; their sheaths shorter than the internodes; ligules truncate. *Panicle* open, its rays erect or ascending. *Spikelets* 2–5-flowered, 3–5 mm. long; *floral glume* webby at base, the nerves silky below.

(Brit. & Br. i, 205. Eurasia and N. Amer. to Rocky Mts.) Magell.; E. Fuegia. (Dusén.)

21. P. PALLENS Poir.

Culm compressed, glabrous, smooth, 60 cm. high. *Leaves* narrow, acute, very long, smooth. *Panicles* 15–20 cm. long, the rays verticillate, numerous, very rough. Raylets filiform. *Spikelets* compressed (pale yellow), shining, about 12-flowered. *Floral glumes* acute, transparent, with membranous margin.

(Argentina); S. Patagon., by Rio Sta. Cruz.; Chubut, "more slender, elongate, the panicles more narrowly linear, elongate, erect and somewhat rigid." (Speg.)

22. P. PATAGONICA Ph.

(*Dioicopoa.*) Stoloniferous and glabrous, 30–60 cm. tall, with 3 nodes. *Leaves* convolute-filiform, coriaceous, scabrous-tipped, shorter than the culm; ligules long, 2-partite. *Panicle* 55–80 mm. long, spike-like, lobed, violet-yellow, the rays spiculiferous from the base or middle. *Spikelets* 8 mm. long, 5–8-flowered; *glumes* 4 mm.; *floral glume* as long, 5–7-nerved, glabrous; palea three fourths as long.

By S. Patagon.

23. P. PRATENSIS Linn.

Culms 60 cm. tall, smooth; *leaves* 10 cm. long by 1–6 mm. wide, basal leaves longer, their sheaths exceeding the internodes; ligules truncate, more than 1 mm. *Panicle* pyramidal, its rays ascending, dividing and spiculiferous above the middle. *Spikelets* 3–5-flowered, 4–5 mm. long, exceeding the pedicels. *Floral glumes* webbed at base, but naked between the nerves.

(Eurasia and N. Amer., also cult.)

Patagon., Chubut, and by Rio Sta. Cruz; Magellan, Falklands; E. and S. Fuegia.

P. PRATENSIS OLIGERIA (Steud.) in Magellan and Fuegia, having convolute rough leaves.

24. P. PUGIONIFOLIA Speg.

Hermaphrodite or polygamous, densely cespitose; sterile and fertile *fascicles* often densely and monostichously crowded on the stolons; all similar. *Leaves* generally distichous, glabrous; the sheaths very broad and close, apically subauriculate; the limbs spreading, very conduplicate, short and rigid, ending in a very acute pungent mucro. *Culms* smooth, erect, slender, simple, naked, or 1-leaved below. *Spike* strict, erect, secund, with 2–3-pedicilliferous nodes, the pedicels scabrid, short with lanceolate, compressed, mostly 2-flowered spikelets, the flowers glabrous, hermaphrodite, often a third flower being added at the top of the rachilla with a rudimentary floriglume.

S. Patagon., in rocks along Rio Chico, at Parr-aike; and Boron-aike by Rio Sehuen.

25. P. PUMILA Phil.

Cespitose. Culms 5–7 cm. high; *leaves* rigid, convolute when dry, the sheaths enclosing nearly the whole culm; ligules long. *Panicle* spreading, its branches paired, few-spiculate. *Spikelets* oblong, 3-flowered. *Glumes* and joints of rachis glabrous; *floral glume* acute.

Turf with culms enclosed by red-brown sheaths of old leaves; like *P. annua*, excepting the leaves.

Colorados, N. Patagon.

26. P. ROBUSTA Steud.

Glaucescent, rigid, erect, 15–30 cm. tall; sheathed by old leaves at base, rather distichously leaf-bearing, the sheaths dilated, ligules short, obtuse, *blades* channeled, convolute, pungent, much shorter than the culm. *Panicle* spike-like; its rays unequal, naked at their base, crowded spiculiferous upwards. *Spikelets* 2–4-flowered. *Glumes* subequal, ovate-lanceolate, shorter than the flowers; *floral glume* similar; *palea* narrower, ciliolate. Spikelets pale-amethyst.

S. Patagon., Punta Arenas; Coy Inlet. (Hatcher, Nov. 23, 1896.)

27. P. SCABERULA Hook. f.

Culm 30 cm. tall, slender, scabrid ("almost smooth," Franchet). *Leaves* few, 10 cm. long, setaceous-involute; sheaths long, scaberulous. *Panicle* dense, rather secund. *Spikelets* small; *glumes* subequal, 1-nerved, the *floral glume* 3-nerved, its keel scabrid above, ciliate below; flowers woolly. Patagon., Chubut; Port Eden; Magellan, E. Fuegia. (Dusén.) "The Chubut specimens are very slender, with long linear spikes." (Speg.)

28. P. STENANTHA Trin.

Culms 30–60 cm. tall. Radical *leaves* narrow-linear; culm-leaves 3–7 cm. by 2–4 mm., ciliate-scabrous on margin; ligules short, rounded. *Panicle* lax, 5–15 cm. long, naked below, few-spiculate above. *Spikelets* 2–5(8)-flowered; *flowers* 4–5 mm. long, rachis flexuous or zig-zag; *floral glume* linear-lanceolate, with infolded margin, its keel ciliate-scabrous.

(Siberia; Alaska; Oregon; Chili); Fuegia at Ushuaia.

29. P. YAGANICA Speg.

Cespitose, glabrous; *culms* 25–90 cm. tall, sheathed halfway or more; *leaves* distichous, plicate below, plane above, their ligules long-toothed. *Panicle* lax, its rays remote, paired, naked downwards; its *spikelets* lanceolate, compressed, 4–6-flowered. *Glumes*, the first acute, scabrid, carinate; the second glabrous; *floral glume* cottony at base.

S. Fuegia.

53. FESTUCA Linn.

Mostly tufted perennials, variously paniculate, with pedicellate 2–many-flowered *spikelets*. The 2 *empty glumes* narrow, unequal, acute, keeled; the first 1-nerved, the second 3-nerved; *floral glume* narrow, rounded on back below, acute, often keeled-awned, faintly 5-nerved; *palea* nearly as long, sharply 2-keeled. *Stamens* 1–3. *Styles* very short. *Grain* within the glume and palea, partly adhering. (Fig. 41.)

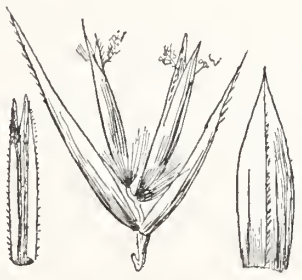


FIG. 41.

Festuca, spikelet, with floral glume on right, and palea on left. *F. pogonantha* (after Franchet).

Species 80, widespread, chiefly in temperate regions. (*F. kerguelensis* Hook. f. in Kerguelen I., and *F. scoparia* Hook. f. in N. Zeal. and Antarctic Islands. *F.*

cookii Hook. f. 1847 = *Poa cookii* Hook. f. 1879, is the commonest grass in Kerguelen I., affording excellent fodder.)

The chief mark of this genus is the rounded floral glumes without any prominent keel, at least at the base, and acute or awned at the top.

KEY TO THE SPECIES.

A. Panicle lax.

b. Spikelets 2–3-flowered. Culm 50 cm., slender, exceeding the convolute leaves. Panicle cernuous, smooth. Glumes and floriglume subequal, awnless. *pogonantha.*

*b*2. Spikelets 3–4-flowered, some viviparous. Culm 50 cm., exceeding the rush-like, pungent leaves. Glumes scabrid, floriglume larger, setulose. *commersoni.*

*b*3. Spikelets 4–5-flowered, 10 mm. long. Culm tall, sheathed. Rays in 2's, capillary. Glumes unequal; floriglume 8 mm., short-awned. *glaucophylla.*

*b*4. Spikelets 5–7-flowered. Culms 45 cm., fertile and sterile; leaves narrow, puberulous. Raylets few-spiculate. Floriglumes 7-nerved, mucronulate. *lechleriana.*

*b*5. Spikelets about 8-flowered. Culms tall.

c. Culms slender, glabrous. Upper glume thrice as long as lower. Floriglume 5-nerved, awned. Leaves short, flat. *purpurascens.*

*c*2. Culms naked a long way. Floriglume 8 mm., cuspidate. Spikelets few, 18 mm. long, 8–10-flowered. *serranoi.*

*b*6. Spikelets large, 8–25 mm. long, often viviparous. Culm 45 cm.; leaves strict, short, ligules long. Floriglume acuminate, silky. *fuegiana.*

*A*2. Panicle oblong-contracted. Floriglumes acute, awnless.

b. Leaf-blades long, smooth, 6–8 mm. broad. Spikelets 4–8-flowered, with woolly rachis. plant robust. *alopecurus.*

*b*2. Leaf-blades narrow-linear, rigid, acute. Spikelets compressed, patent. *antarctica.*

*A*3. Panicle contracted, subsecund. Culms slender, 40 cm., tufted or creeping. Leaves one third as long. Spikelets 3–8-flowered; floriglume short-awned. Also sterile shoots. *ovina.*

*A*4. Panicle racemose, secund.

b. Leaves narrow-linear; culm and sheaths glabrous. Rays alternate. Spikelets 5–9-flowered. Awns rough, exceeding the smooth floriglumes. *muralis.*

*b*2. Leaves convolute, with auriculate ligules. Culm 20 cm., basally jointed and sheathed, Glumes unequal, the lower setaceous. Flowers in 5's, long-awned. *myurus.*

*b*3. Leaves linear-setaceous; culm 25 cm. Panicle spike-like in upper part. Lower glume small. Awn twice as long as floriglume. *bromoides.*

*A*5. Panicle long-racemose, not secund.

b. Leaves linear-filiform. Culm 1 meter, slender. Panicle inclined, few-spiculate. Spikelets 7–9-flowered. Awn short. *gracillima.*

*b*2. Leaves linear, with long ligules; culms thrice as long, 28 cm. Spikelets 4-flowered. Floriglume 1-nerved, keeled above, awnless. *patagonica.*

*b*3. Leaves flat, narrow, 1–4 cm. long; culm 25 cm., branching. Spikelets few, 2-flowered. Lower glume the longer. Floriglume 5-nerved, awnless. *biflora.*

*A*6. Panicle strict, its rays paired or solitary. Leaves thickish, lanceolate, acuminate. Spikelets few, 7-flowered. Floriglume setulose. *platyphylla.*

A7. Panicle spike-like, afterwards spreading. Slender annual, 15 cm. tall, with convolute-setaceous leaves. Spikelets 4–5-flowered, at length awned. *eriolepis.*

A8. Panicle spicate. Plants glabrous.

b. Awnless.

c. Leaves convolute, pungent, the lower spreading fan-like. Spikelets compressed, 3-flowered. *arenaria.*

c2. Leaves involute with long ligules, equalling the culm, 20 cm. Rays in 2's and 3's. Spikelets 4-flowered. *shuka.*

b2. Short-awned. Leaves setaceous, pungent. Panicle secund, with rough rachis and floriglume. Spikelets 3–4-flowered. *erecta.*

b3. Long-awned. Culm 25 cm.; leaves much shorter, subulate; ligules none, but sheaths auricled. Rays in 2's. Spikelets 3-flowered. *pyrogea.*

1. F. ALOPECURUS Schreb. (Kunth sub *Poa*).

Robust, 60–90 cm. tall; sheaths smooth, compressed, 30 cm. or more; *leaf-blades* long, smooth, 6–8 mm. broad; ligules ovate, 10 mm. long, *Panicle* contracted, oblong-elliptical, 12 cm. long, dense, shining. *Spikelets* (female) 4–8-flowered; the *glumes* oblong-lanceolate, scarcely as long as the flower; rachis long, woolly; *floral glume* apically attenuate, acute, keeled, ciliate on the 3–5 nerves; *palea* narrower, shorter.

(West Mediterr. region); widely spread from Entrerios to N. Patagon., "fueo-catschu." (J. Ball.)

2. F. ANTARCTICA Kunth.

Leaves erect, long-sheathing, narrow-linear, rigid, acute. *Panicle* contracted, oblong, interrupted at base. *Spikelets* compressed, spreading; fascicles of hairs rare, short; *floral glume* acute. Several varieties arise from differences of size, and of pilosity of flowers. Possibly it is the same species as *F. arundo* (*Poa alopecurus*).

Falklands, abundant; Fuegia, Good-success Bay.

3. F. ARENARIA Lamk.

Glabrous; *culms* compressed, slender. *Leaves* convolute, pungent, the lower equal and spreading, fan-like, the upper short. *Panicle* spike-like, its rays distant, fastigiate. *Spikelets* compressed, about 3-flowered; the *glumes* equal; *floral glume* awnless.

Magellan; Falklands; Fuegia to near Cape Horn. "Floral glumes often notched on each side, as in *Dactylis*. Fuegian specimens often viviparous."

4. F. ARUNDO Hook. f. (*Poa alopecurus* Kunth.)

5. F. BIFLORA Steud.

Culm branching at the base, thin, glabrous, not 30 cm. high; with sterile branches in dry sheaths; culm-sheaths green, ligules oblong, 2 mm., *leaf-blades* flat, narrow, 1–4 cm. long, 0.5 mm. wide. *Panicle* very narrow, racemose; the rays solitary, 1–3-spiculate; the *spikelets* lanceolate, 2-flowered. *Glumes* shorter than the flowers, the lower one the longer. *Floral glume* 5-nerved, obtuse or subacute. *Grain* obscurely trigonal.

Patagon., by saline lakes.

6. F. BROMOIDES Linn.

Culm 15–30 cm. high; the *leaves* linear-setaceous, complicate. *Panicle* secund, spicate upward. The *glumes* unequal, lanceolate, acuminate, the upper 3-nerved, as long as the lower flower; the lower 1-nerved, one third as long. *Floral glume* scabrous towards the point, its *awn* twice as long as its flower.

(Eur.) Falklands, near the settlements, as if introduced.

7. F. COMMERSONI Franchet.

Cespitose, glabrous, glaucous. *Culms* smooth, slender, erect, 50 cm. tall; *leaves* shorter, rush-like, rigid, pungent. *Panicle* short, its lower rays long, spreading. *Spikelets* 3–4-flowered, mostly viviparous. *Glumes* purplish, ovate-lanceolate, scabrid, margin ciliate; *floral glume* larger, setulose. Palea ciliate-keeled.

Magellan, Churucca; Fuegia, Beagle Channel, and near Cape Horn; W. Patagon. (Dusén.)

F. COMMERSONI VIVIPARA.

W. part of Magellan Str. (Dusén.)

8. F. ERECTA d'Urville.

Leaves setaceous, erect, glabrous, slightly pungent (9 cm.), as long as the subspicate, secund *panicle*. Rachis very rough, *spikelets* oblong-lanceolate, 3–4-flowered; *flowers* erect, approximate; *glumes* unequal; *floral glume* rough, shortly awned.

Fuegia to Hermite I.; Falklands. (See note on *Gynerium pilosum*, p. 213.)

F. ERECTA CIRROSA Speg.

Leaves coarse and rigid, cirrose or subcircinate.

Fuegia, Puerto Roca.

9. F. ERIOLEPIS Desv.

Slender, cespitose annual, 10–20 cm. high, branching at the base. *Leaves* convolute, setaceous. Ligules very short, 2-auricled. *Panicle* 25–50 mm., somewhat spiciform, erect, spreading in anthesis. *Spikelets* 4–5-flowered. *Glumes* unequal, the lower linear, 1-nerved, acute; the next broader, 3-nerved, longer. *Floral glume* with rigid, spinose hairs, at length awned. *Stamen* 1.

(Chili.)

F. ERIOLEPIS NANA Hier.

Culms 3–7 cm. tall. Leaves 15–20 mm. long. Panicle spike-like, 10–15 mm. long.

N. Patagon., at Carmen de Patagones, Golfo de San Jorge.

10. F. FUEGIANA Hook. f.

Erect, tall, 30–60 cm., glabrous. *Leaves* substrict, short, 7–10 cm.; broadly linear, acute, involute-margined. Ligules long. *Panicle* effuse or contracted, 10 cm. long with scabrous rays. *Spikelets* 8–10 mm. *Glumes* ovate-lanceolate, acuminate, subcarinate. Flowers short-pediceled, webby at base. *Flowering glume* acuminate, 5-nerved, the nerves silky on the back. (Fig. 42, on right.)

Patagon., Chubut; Fuegia, everywhere in rocky, maritime and mountainous parts.

F. FUEGIANA VIVIPARA Hook. f.

Viviparous form, with glabrous culms and effuse panicle, and spikelets 25 mm. long. (Fig. 42, on left side.) Patagonia.

FIG. 42.

Festuca fuegiana. Spikelets, normal on right, viviparous on left. (From *Flora Antarct.*)

11. F. GLAUCOPHYLLA Phil.

Culm tall, sheathed almost to top, scabrous near top. Ligules short. *Panicle* 20 cm. long, lax, 2 rays in semiwhorls, these long, capillary, spiculiferous at top.

Spikelets 10 mm. long, 4–5-flowered. *Glumes* unequal; *floral glume* puberulous, 8 mm., shortly *awned.*

W. Patagon., by Rio Palena.

12. F. GRACILLIMA Hook. f.

Glabrous. Culms tall, nearly a meter, slender, exceeding the linear-filiform, involute *leaves. Panicle* simple, long, few-flowered, inclined. *Spikelets* rather large, 7–9-flowered, exceeding the flat pedicels. *Glumes* unequal, linear-oblong, scarious-bordered, the upper broader, 3-nerved; *floral glume* puberulous, shortly awned. Flowers remote at the base.

(Calif.) Magellan; Valley of Rio Gallegos; N. and E. Fuegia (Dusén); N. Patagon., by Lago Nahuel-huapi, W. Patagon., by R. Aysen, on the elevated steppes (Dusén).

F. GRACILLIMA BREVIFOLIA Speg.

Leaves more rigid than in the type, half as long as the culm. *Panicle* more lax and strict.

Magellan, by Gregory Bay and Possession Bay; Fuegia.

F. GRACILLIMA PATAGONICA Speg.

Leaves coarser, rigid, more trigonal. *Floral glumes* puberulous. S. Patagon., by Rio Gallegos.

13. F. LECHLERIANA Steud.

Somewhat creeping. *Culms* 30–60 cm. high, the floriferous and the sterile mixed. *Leaves* narrow, canaliculate or convolute, puberulous; ligules short, ciliolate above; lowest with short sheath and short blade. *Panicle* 7–10 cm. long, the rays solitary and paniculately divided, the raylets few-spiculate. *Spikelets* 5–7-flowered; flowers lax. *Glumes* lanceolate, exceeding the lowest flower; *floral glume* 7-nerved, mucronulate below the apex.

Magellan.

14. F. MURALIS Kth.

Culm and sheaths glabrous. *Leaves* narrow-linear, internally pubescent. *Panicle* simple, secund, its rays alternate. *Glumes* all glabrous; *spikelets* lanceolate, compressed, 5–9-flowered, with rough *awns* which exceed the non-ciliate floral glumes.

(Chili, etc.); Patagon., by Rio Chubut, on dry, elevated plains.

F. MURALIS PYGMÆA.

Patagon.; at Puerto Madryn.

15. F. MYURUS Linn.

Root fibrous. *Culm* basally geniculate, erect, 15–30 cm., covered by sheaths up to the panicle. *Leaves* convolute; ligules 2-auricled. *Panicle* long, racemose, subsecund, erect or nodding. The upper empty *glume* acute, the lower setaceous shorter. *Flowers* in fives, lanceolate-subulate, attenuate, *long-awned*, scabrid.

(S. Eur.; Argent.); Patagon.

16. F. OVINA Linn.

Slender-tufted or creeping, 15–50 cm. high; leaves one third the height of the culm; the sheaths with auricled throat and short ligules; culm 2–3-leaved; sterile shoots with numerous leaves, more or less conduplicate. *Panicle* compact, subsecund, 3–10 cm. long. *Spikelets* subelliptical, 3–8-flowered; *floral glume* narrow, scarious-margined, involute with age, shortly awned. *Grain* oblong, grooved, adhering to glume and *palea*.

(In N. Hemisphere, greatly varying; Brit. & Br. i, 217.)

16*b*. F. OVINA ANTARCTICA Hack.

As var. *magellanica*, but its *leaves* are (especially the sheaths), waxy-glaucous, the *culms* low, 4–5 cm., the *panicle* only 2–3 cm. long; floral glumes strigillose.

E. Fuegia. (Ansorge.)

16*c*. F. OVINA BREVIFOLIA S. Watson.

Leaves all setaceous, the uppermost very short, almost obsolete, sheaths loose, soon splitting.

(Subarctic in both hemispheres; and in Rocky Mts.)

At Coy Inlet. (J. B. Hatcher, Nov. 23, 1896.)

16*d*. F. OVINA DURIUSCULA (L.). *F. duriuscula* Linn. Hard Fescue.

Culms rather tall and stout, and *leaves* firm, usually smooth. *Panicle* mostly lax; floral glumes 6 mm. long.

(Eurasia; Algeria; nat. in N. Amer.; Austral.; N. Zeal.); Magellan, Fuegia.

16*e*. F. OVINA MAGELLANICA (Lam.) Hack. (*F. magellanica* Lam.)

Rhizome branching, its branches long-filiform, producing fertile and sterile *culms* to 20 cm. high. *Leaves* shorter than culm, convolute-filiform, pubescent inside, smooth outside; ligules short, ciliolate. *Panicle* simple, slightly unilateral, rigid, 5–7 cm. long; its *spikelets* 7–10 mm., oval, 4–5-flowered. *Glumes* unequal, acute, the lower 1-nerved, linear, the upper 3-nerved, lanceolate, half as long as the spikelet. *Flowers* spreading, not purplish but olive, *shortly awned*. *Ovary* glabrous. Varying much, foliage always rigid.

Magellan, Fuegia; Falklands.

17. F. PATAGONICA Phil.

Culm 28 cm. high, glabrous, purplish; *leaves* erect, narrow-linear, plane, rarely half as high as the culm; ligules long. *Panicle* contracted, linear; pedicels scabrid. *Spikelets* 7 mm. long, 4-flowered; *glumes* subequal, ovate-acuminate, toothed above in the keel; upper empty glume 3-nerved at base, 3 mm. long; *floral glume* ovate, obtuse, 1-nerved, keeled from the middle, 4 mm.

At Lago Pinto, S. Patagon.

18. F. PLATYPHYLLA Steud.

Culm stout, erect, 45–60 cm., glabrous. *Leaves* thickish, lanceolate, rigid-acuminate, 7–17 cm. by 8 mm. at base; ligules short, laciniate; the lowest sheaths often ending in short lanceolate appendages. *Panicle* strict, its rays paired or solitary, angular; raylets few-spicular. *Spikelets* lax, 7-flowered; *glumes* unequal, shorter than the lowest flower, green-purplish; *floral glume* with minute setulæ.

Magellan.

19. F. POGONANTHA Franchet.

Cespitose, glaucous; *culms* tall, to 60 cm., slender, smooth. *Leaves* much shorter, smooth, convolute. *Panicle* lax, cernuous, its rays rather short, suberect. *Glumes* lanceolate, mucronate, purplish, the lower scarcely more 3-nerved than the upper. *Flowers* 2–3, scarcely exsert,

enclosed by hairs; *floral glume* like the empty glumes, acute; *palea* bicuspidate, marginally long-ciliate. Occasionally viviparous. (Fig. 41.)

Patagon. (Port Eden); Fuegia.

20. F. PURPURASCENS Banks & Sol.

Stoloniferous. *Culms* tall, to one meter, slender, glabrous, remotely nodose. *Leaves* plane in part, acuminate, shorter than the culm. *Panicle* lax, inclined, its rays elongate, few-flowered at the apex. *Spikelets* oblong, 12 mm. long, about 8-flowered; *glumes* 3-nerved, lanceolate, the upper thrice larger; flowers glabrous; *floral glume* 5-nerved, 3-toothed, the midtooth *awned*. (Fig. 43.)

Magell.; Sta. Cruz Valley (Hatcher); Fuegia (Hatcher).

FIG. 43. *Festuca purpurascens*. Spikelet.

21. F. PYROGEA Speg.

Perennial, cespitose, small, 20–30 cm. tall, the *leaves* shorter than the pubescent *culm;* ligules none, but sheaths auricled above; the leaf-blades subulate, glabrous, slender, rigid, obtusely pointed. *Panicle* as a lax spike, the rays paired. *Spikelets* lanceolate, compressed, 3-flowered. *Glumes* unequal, subcarinate. *Floral glume* 3-nerved, scabrid, long *awned*. Palea hyaline-bifid.

S. Fuegia, at Ushuaia, found once only, but abundant. (Speg.) "Marked by the *leaves* being without ligules, the *sheaths* having bilaterally unequal *auricles*, subulate *laminæ*, and pubescent *culms*."

22. F. SERRANOI Phil.

Culm tall, naked a great way at the top, smooth; ligules short. *Panicle* 22 cm. long, few-flowered; the semi-whorls far distant, each ray 2-branched, and each branch 5-spiculate at the top. *Spikelets* 8–10-flowered, 18 mm. long; *floral glume* 8 mm., cuspidate.

W. Patagon., by Rio Palena.

23. F. SHUKA Speg.

Perennial, cespitose, small, 12–30 cm. tall, the *leaves* involute, glabrous, scarcely shorter than the culms; ligules long, acute, exsert. *Panicles* spike-like; the rays in 2's or 3's. *Spikelets* lanceolate, compressed, 4-flowered. *Glumes* equal, long, navicular-carinate. *Floral glume* relatively broad, 7–8 mm. by 2 mm., rough, apically mucronate, *not awned*.

Beautiful with its long ligules; habit of *F. antarctica* Kth.
Staaten I., Fuegia; rare in maritime, rocky places.

54. BROMUS Linn. Bromegrass.

Leaves flat, the sheaths often closed. *Panicles* exserted, the pedicels thickened above; the *rachilla* articulated between the floral glumes. *Spikelets* large, several-flowered. *Glumes* unequal, the empty glumes not awned, or the second sometimes with a short awn; *floral glume* longer, 5–9-nerved, the apex hyaline, bifid, the midnerve produced as an *awn; palea* as long, its two keels ciliate. *Stamens* 3 or fewer. *Styles* short, lateral. *Grain* adhering to the palea.

Species 40, in temperate regions. Brit. & Br. i, 219.

Key to the Species.

A. Spikelets 1–4-flowered, plant robust, with rather broad, long leaves. Rays in 5's, each 1–3-spiculate. Spikelets 13 mm. long. *patagonicus.*

A2. Spikelets 2–6-flowered, 12–25 mm. long, the flowers not imbricate. Awn jointed and twisted. Cespitose, 60 cm. tall. *trinii.*

A3. Spikelets 4–7(12)-flowered.

b. Spikelets 5-flowered, with short awns. Culms about 25 cm.

c. Panicle simple, its rays 1-spiculate; spikelets to 15 mm. Leaves linear, velvety. Floriglumes 5-nerved. *pellitus.*

c2. Panicle 4-spiculate; spikelets longer than their pedicels, purplish. Leaves puberulous; floriglume silky. *pictus.*

b2. Leaves hairy or rough.

c. Culm 10 cm.; leaves narrow, convolute-setaceous. Spikelets 1–3, each 6–12-flowered. Floriglume 9-nerved, awn rather long. *macranthus.*

c2. Culm 50 cm.; leaves linear. Panicle nutant, rays mostly in twos. Spikelet 5–6-flowered. Floriglume 9-nerved, with short straight awn. *hænkeanus.*

c3. As *hænkeanus*, but spikelets 4–5-flowered, and floriglumes 7-nerved. *andinus.*

c4. Culm 75 cm.; leaves flat. Panicle rays 2–3-spiculate. Floriglume 14 mm., very acute, short-awned or awnless. *unioloides.*

b3. Leaves glabrous, flat. Culms 1 meter tall. Awns short.

c. Stout, nodes all subbasal. Leaves linear. Panicle 18 cm. long, rays 2-spiculate. Spikelets 2 cm., green and violet, 4–6-flowered. Floriglume 16 mm. long, 7-nerved. *hackeli.*

c2. With woody rhizome. Leaves lanceolate, rough-edged. Panicle 30 cm. long; rays 1–3-spiculate. Spikelets violet to white, variegated. Empty glumes short. *coloratus.*

1. B. ANDINUS Phil.

Culms 1 meter high, smooth; leaves and sheaths except the lowest glabrous; *leaves* plane, with a long ligule. *Panicle* 25 cm. long, few-flow-

ered, lax; the paired rays of each semiverticil bearing on their upper half few acute spikelets; pedicels nearly equalling the spikelets, rough, gradually thicker. *Spikelets* to 27 mm. long, 4–5-flowered; *glumes* 3-nerved, 11 mm. long, the upper a third larger; *floriglume* 13 mm. long, 7-nerved, margin broad, scabrous, hyaline, *awn* 5 mm.

In Andes of Chillan (Spegazzini); its lower leaves 5 mm. broad; ligules 5 mm. long. Differs from *B. hœnkeanus* by its acute, 4–5-flowered spikelets.

B. ANDINUS SCABRIVALVUS Speg.

Glumes minutely appressed-pubescent.

Chubut, by Lago Fontana.

2. B. COLORATUS Steud.

Rhizome woody. *Culm* jointed at the base, stout, 1 meter high, striate, glabrous. *Leaves* lanceolate, 15–30 cm. by 1–4 mm., rough-edged; the ligules ovate, toothed. *Panicle* 30 cm. long, its rays semi-verticillate, rough, naked at base, 1–3-spiculate. *Spikelets* compressed, 5–7-lax-flowered, violet to whitish, variegated. *Glumes* shorter than the lowest flower; *floral glume* glabrous, shortly *awned* below its apex.

Magellan, Punta Arenas; Fuegia, south of Navarino I.

B. COLORATUS VIVIPARUS Steud.

Differs from the species by having *spikelets* green, few-flowered, very large (40–50 mm. by 10 mm.); *flowers* awnless, the lower sterile, the upper viviparous.

Fuegia, by borders of woods.

3. B. HACKELI (Hack.) Macl. (*B. patagonicus* Hack. *nec* Phil.)

Culm erect, 1 meter high, stout, glabrous, its few nodes crowded below. Sheaths close, the lower pubescent; ligules ovate, 3–4 mm., erose; *leaf-blades* linear to 12 cm. by 4 mm., glabrous. *Panicle* oblong, rather simple, to 18 cm. long; its rays paired, rough, 2-spiculate. *Spikelets* oblong, 2 cm. long, compressed, mixed green and violet, 4–6-flowered. *Empty glumes* slightly unequal (10–12 mm.), lanceolate, 3- and 7-nerved, keels rough; *floral glume* lanceolate, acute, 16 mm., 7-nerved, shortly awned; *palea* as long, its keels spinulose-ciliate. *Ovary* 3-horned.

So. Patagon. (O. Nordenskjöld.)

4. B. HÆNKEANUS Knth.

Root fibrous. *Culm* erect, terete, glabrous, to 60 cm. tall. *Sheaths* rough-hairy; ligules ovate, exsert, denticulate. *Leaves* linear, plane, both sides rough. *Panicle* simple, contracted, nodding; rays in 2's below, single above, about 1-spiculate, and the *spikelet* 5–6-flowered. *Lower glumes* ovate, 3 and 9-nerved; *floral glume* 9-nerved, rough, 2-toothed, with a short straight *awn* between its teeth.

Patagon., Chubut, in upland meadows.

5. B. MACRANTHUS Meyen. (*B. setifolius* Presl.)

Cespitiferous annual with fibrous roots. *Culms* decumbent at base, terete, striate (10–12 cm.), rough at the panicle and sheaths. Ligule short, ovate, fimbriate. *Leaves* narrow-linear, convolute-setaceous, rigid, hairy. *Panicle* depauperate, of 1–3 spikelets, each 6–12-flowered. *Glumes* roughish, slightly unequal, 3–5-nerved; *floral glume* oval, 9-nerved, rough, obtuse; subapical *awn* two thirds as long as the spikelet.

(Mex.; Chili); Patagon., Chubut.

(*B. mango* Desv. formed the chief bread-stuff in Chili before the advent of Old World cereals. Its grain has a linear hilum.)

6. B. PATAGONICUS Phil.

Culm robust, smooth, sheaths glabrous, ciliate below the mouth; ligule truncate, denticulate; *lamina* of upper leaves broad, very long. *Panicle* erect, its rays in 5's, each bearing 1–3 *spikelets;* these 13 mm. long, 4-flowered. *Glumes* ovate-lanceolate, acute, unequal, the lower 1-nerved, the upper 3-nerved. *Floral glume* with appressed hairs; subapical awn more than one third its length.

Chili; Patagonia.[1]

[1] By the courtesy of Miss Day of the Gray Herbarium I give Philippi's description of this little-known species:

BROMUS PATAGONICUS Ph. Br. robustus, glabriusculus; vaginis lævibus, glabris, infra os ciliatis; ligula truncata, denticulata; lamina foliorum superiorum longissima, lata; panicula erecta ramis quinis in quovis semiverticillo, erectis, apice spiculas 1 ad 3 gerentibus; spiculis pedicello longioribus, 6 lin. (13 mil.) longis, quadrifloris; glumis ovato lanceolatis, acutis inæqualibus, inferiore uninervia, superiore trinervia, dimidiam spiculam æquante; palea inferiore (sublente fortiori pilis appressis vestita) uninervia, apice biloba; arista sub apice orta tertiam paleæ partem superante.

Philippi, Anal. Univ. Chile, XLIII, 1873, p. 577.

7. B. PELLITUS Hack.

Culm low, 20 cm., erect, rather robust, pubescent. *Leaves* velvety, linear-obtuse, 4 cm. by 2–3 mm., the ligules truncate. *Panicle* 4 cm., oblong, crowded, simple, its rays 1-spiculate. *Spikelets* oval, to 15 mm. long, 5-flowered, with dense hairs; glumes 3-nerved, 6 and 8 mm. long; *floral glume* dorsally velvety, 5-nerved, shortly awned; palea as long, truncate, its keels ciliolate.

Has the habit of *B. mollis* L.

S. Fuegia. (Dusén.)

8. B. PICTUS Hook. f.

Culm simple, 30 cm. tall, strict, puberulous. *Panicle* simple, 4-spiculate, the spikelets exceeding the pedicels. *Glumes* linear-oblong, subacute, 5-flowered, purple; *floral glume* linear-ovate, obtuse, with a short infra-apical *awn*, 7-nerved, silky towards the base.

Magellan, Punta Arenas; E. Patagon. Characteristic of the grassy plains. Fuegia.

9. B. TRINII Desv.

Cespitose annual, 15–90 cm. high. *Leaves* glabrous or hairy. Ligules ovate, toothed. *Spikelets* 2–6-flowered, 12–25 mm. long, subcompressed, ovate or lanceolate. *Glumes* linear, acuminate, 1–3-nerved; flowers not imbricate. *Floral glume* linear-oblong, attenuate both ways, 5-nerved, hirtellate, 2-lobed, awned between the lobes, the *awn* twisted, geniculate, divaricate.

Patagon., at Puerto Madryn; in woods on Cordilleras.

10. B. UNIOLOIDES Kth. Southern Chess.

Culm erect, to 90 cm. tall, 4–5-leaved, mostly glabrous. Lower sheaths often overlapping and often rough; leaf-blades flat, scabrous on upper surface. *Panicle* rays erect or spreading, in 2's or 3's, few-spiculate upwards. *Spikelets* compressed, 6–10-flowered. *Empty glumes* unequal, acute, firm, 3–5- and 5–9-nerved; *floral glumes* very acute, 12–16 mm. long, awn short or wanting. *Palea* 10 mm., pectinate-ciliate, incurved.

(In southern U. S. and through S. Amer. Brit. & Br. i, 224.) N. Patagon.; S. Patagon. (Dusén); Magellan; Fuegia.

B. UNIOLOIDES HIRSUTUS Speg.

Dwarf, 20–40 cm. high. *Leaves* laxly pilose, their sheaths retrorsely hirsute.

S. Patagon., by R. Sta. Cruz.

B. UNIOLOIDES HUMILIS Speg.

Dwarf, 10–15 cm. high, glabrous. *Leaves* narrow, short, subrigid. *Culm* erect, few-flowered. *Spikelets* 4–5-flowered, shining.

S. Patagon., by RR. Gallegos and Sta. Cruz.

B. UNIOLOIDES MICRANTHUS Speg.

Variety slender, tall and glabrous; *panicles* narrow, erect; *spikelets* not nutant, small, 3–4-flowered (8–10 mm. by 3 mm.), compressed and pale green. *Glumes* and *paleæ* acute, *not awned.*

Patagon., Chubut, in marshy woods.

55. LOLIUM Linn. Darnel.

Flat *leaves*, and terminal, often long, *spikes; spikelets* solitary, sessile and alternate in the notches of the rachis; compressed with their edge towards the rachis; having each only 1 *empty glume*, except the terminal spikelet which has 2.

Species 6, of the Old World; introduced to Amer.

1. L. BRASILIANUM Nees.

Root repent, with leafy fascicles. *Culms* ascending, 15–45 cm. high, simple, compressed, above retrorsely scabrous. *Leaves* linear, plane, acuminate. *Spike* nearly muticous (5–15 cm.); *spikelets* 5–10-flowered. *Floriglumes* acute, the upper short-setulose below their apex. Perennial.

(Brazil); N. Patagon., in elevated places near Rio Negro.

2. L. PERENNE Linn. Ryegrass.

Root perennial. *Empty glume* shorter than the 8–15-flowered *spikelet; floral glume* awnless or shortly awned.

(Eur., nat. in N. Amer., Brit. & Br. i, 225.)

Magellan (Dusén); Falklands, on sandy shores.

3. L. TEMULENTUM (Desv.) Hack. Bearded Darnel.

Root annual. *Empty glume* as long as the 5–7-flowered *spikelet; awn* 12 mm. long, exceeding the flower. The seeds have a narcotic poison.

(Eurasia; N. Amer.) Magellan. (Dusén.)

56. LEPTURUS R. Br. Hard-grass.

Low, branching annuals, or taller perennials, with narrow *leaves*. *Spike* simple, terminal, slender, having 1–2-flowered spikelets, distichous in the excavations of a jointed rachis. Rachilla short, articulated above the lower glumes; produced like a short awn. *Empty glumes* 1–2, rigid, much longer than the hyaline *floriglume*. *Palea* hyaline, 2-nerved.

Species 6, Old World, some in Austral., N. Zeal. and Pacific Is., and 1 introduced to U. S. (Eng. & Pr. ii. 2, 25, fig. 15.)

L. CYLINDRICUS Trin. Arech. Las Gram Urug., p. 4,689, n. 69.

N. Patagon. in dry places near Carmen.

57. AGROPYRON J. Gaertn. Wheat-grass.

Spikes simple, terminal, with large, many-flowered, sessile spikelets, single and alternate in the notches of the rachis; the *spikelets* compressed, with their sides towards the rachis. The 2 *lower glumes* empty; the *floral glume* rigid, rounded, its 5–7 nerves partly connivent above, having a callus which falls off with the ripe grain; palea often ciliate on its keels. *Styles* short; *grain* pubescent at apex. *Upper flowers* of the spikelets often more or less imperfect. (Distinguished from *Triticum* by its floral glumes having connivent nerves, and the deciduous callus.)

Species 30; of temperate regions.

1. A. ELYMOIDES Hack.

Cespitose; *culm* stout, 20–30 cm. tall, glabrous, 2-nodal, naked upwards; the sheaths resolved into fibers, the *leaf-blades* linear-acute, 8–10 cm. by 2–3 mm. *Spike* linear, dense, 6–8 cm. long. *Spikelets* imbricate, ovate-oblong, 3-flowered and a rudiment, 12 mm. long. *Empty glumes* subequal, very narrow linear-lanceolate; *floral glume* much broader, 8–10 mm., ending in an awn of 3 mm. *Palea* as long, its keels ciliolate.

E. Fuegia. (Dusén.)

2. A. FUEGIANUM (Speg. sub *Triticum*).

Perennial. Base cespitose or creeping. *Leaves* fasciculate, erect, hispid, much shorter than the fertile culms; their laminæ plane, narrow, apically involute-subulate; ligules very short, truncate. *Culms* erect,

sheathed half-way, shining. *Spike* short, lax, few-flowered. *Spikelets* sessile. *Empty glumes* obovate, glabrous, awnless. Floral glume 5–7-nerved, coriaceous, scabrid upwards, *awned; palea* hyaline, subretuse, its margin pectinate-ciliolate.

W. Fuegia, by margin of salt lakes.

A. FUEGIANUM PATAGONICUM Speg.

Leaves and sheaths glabrous. *Ligules* more developed than in the type. *Spike* more depauperate; spikelets more remote. *Glumes* longer, awned. *Floral glume* more glabrous.

S. Patagon., by Gregory Bay, and Rio Sta. Cruz.

3. A. MAGELLANICUM Hack. (*Triticum repens magellanicum* Desv. *T. magellanicum* var. *glabrivalva* Speg.)

Rhizome creeping. Culm 45–90 cm. high. *Leaves* internally punctate-scabrid, plane or convolute; ligules very short, toothed. *Spike* 8–15 cm. long, green. *Spikelets* erect, rather lax, oblong-elliptical, compressed, 12–16 mm. long, 3–4-flowered. *Glumes* subequal, half as long as the spikelets, convex, 4–6-nerved, inequilateral, muticous or mucronate, apically erose. *Floral glume* 5-nerved, oblanceolate-elliptical, muticous or short-awned, often emarginate, outside densely hairy-scabrid.

S. Patagon. on eastern and western coasts; Magellan; Fuegia; Staaten; Falklands.

A. MAGELLANICUM CONDENSATUM (Presl.) Speg. (sub *Triticum*).

Leaves involute, rather scabrous; sheaths glabrous; ligules short (1 mm.), truncate, entire. *Spike* distichously branching, dense, erect, strict (7 cm.). *Rachis* triquetrous. *Spikelets* 6-flowered. *Glumes* oblong-lanceolate, acute, 7-nerved, half as long as the lanceolate flowers; *floral glume* 5-nerved, scabrous, mucronate; *palea* emarginate, bidentate.

Perennial (Chili?); Fuegia; S. Patagon. by Rio Sta. Cruz.

A. MAGELLANICUM FESTUCOIDES Speg.

Pedicels long. *Flowers* at length lax. Empty and floral *glumes* more narrow and acute than in the type. (Perhaps a distinct species.)

S. Patagon., by Rio Sta. Cruz.

A. MAGELLANICUM LASIOPODUM Speg.

Green, not rigid. *Spikelets* slender; pedicels very short, densely silky-bearded. *Glumes* hirsute, acute, awned, as long as the rough flowers. Lowest *leaves* pubescent. (Perhaps a distinct species.)

S. Patagon., by Rio Sta. Cruz.

A. MAGELLANICUM SECUNDUM (Presl). (*Triticum secundum* Presl.)

Root creeping. *Culm* basally ascending, then erect, covered by sheaths and with glabrous nodes. Margin of ligule narrow; *leaves* involute, scabrid. *Spike* secund, erect, dense, 10 cm. long; rachis semiterete; *spikelets* 3-flowered. *Glumes* lanceolate, rather shorter than the spikelets, 7-nerved, mucronate, scabrid, as is the 5-nerved *floral glume*. *Awn* not as long as the floral glume. Perennial.

(Chili); S. Patagon., by Rio Chico de Sta. Cruz; Magellan; Fuegia.

4. A. PUBIFLORUM Steud.

Root long-fibrous (scarcely creeping); *culm* jointed at the base, thence or entirely erect, 60–90 cm. tall, terete, glabrous. *Sheaths* striate, glabrous (the lowest slightly violet); ligules short, hyaline, obtuse, denticulate. *Leaves* narrow-linear, subsetaceously-attenuate, smooth, glabrous, 10–25 cm. long. *Spike* long, erect, to 15 cm., rather distichous. *Spikelets* 5–7-flowered. *Glumes* lance-ovate with hyaline-membranaceous margin, acute, 3–5-nerved, rough on the nerves. Rachis angular-setulose. Flowers distinct; *floriglume* puberulous all round, ciliolate, 5-nerved, long-acuminate (not awned). *Palea* as long, narrower, its keel ciliolate.

Magellan; Cabo Negro; Rio Gallegos; common through Fuegia.

5. A. REPENS (Linn. sub *Triticum*) Beauv. Couch-grass.

Rootstock long, jointed. *Culm* 30–120 cm. tall; sheaths glabrous; *leaves* 20 cm. by 5–10 mm., rough on upper surface, their ligules short. *Spike* strict, 6–20 cm. long; *spikelets* 10–20 mm., 2–5-flowered, the mid-flowers overlapping. *Empty glumes* unsymmetrical; *floral glume* 10 mm. long, cuspidate or shortly awned.

Many varieties, from differences in size of spikelets, in forms of glumes, etc. (Brit. & Br. i, 226.)

(Eurasia, N. Afr.; nat. in N. Am. A mischievous weed in cultivated lands.) Patagon.; Magell.; Fuegia to Cape Horn; Falklands.

A. REPENS PUNGENS Brongn.

Glumes and *paleæ* pubescent; *spikelets* with up to 6 flowers. Plant more stout than the northern form.

Patagonia.

58. HORDEUM Linn. Barley.

Erect annuals, rarely perennials, with flat *leaves*, and terminal *spikes* having 1-flowered *spikelets* inserted in triplets, or 2, or 6, at each joint of the rachis; the mid-one of each triplet being sessile, and the lateral pair with short pedicels and imperfect flowers. *Rachilla* articulated below the flowers, and produced above them as long awns or as glumes. *Empty glumes* rigid, often awn-like, and the six belonging to each triplet forming an involucre. *Floral glume* strong-awned; palea nearly as long. *Styles* short; *grain* adherent to the palea.

Species 16, in Eurasia, N. Afr. and Amer.

KEY TO THE SPECIES.

A. Spikelets distichous, 2-ranked in the compressed, subcurved spike. Of the paired spikelets one is perfect and one neutral. Floriglumes awnless. *andicolum.*

A2. Tristichous, spikelets in triplets.

b. Culm creeping. Leaves hairy. Glumes all setaceous and scabrid. Mid-floriglume long-awned. Lateral spikelets male. *comosum.*

b2. Spike cylindrical, slender. Leaves short, convolute. Glumes scabrid; mid-floriglume long-awned; lateral spikelets neuter. *chilense.*

b3. Spikes breaking into segments when ripe.

c. Hairy. Coarse annual. Leaf-blades 5 cm. long. Joints of rachis 3 mm. Spike partly sheathed. Mid and lateral floriglumes dorsally flat, scabrous above. *murinum.*

c2. Glabrous. Joints of rachis less than 2 mm.

d. Culm basally geniculate.

e. Culm 20 cm. Leaves narrow. Spike rigid, scarcely protruding. Empty glumes smooth. Lateral spikelets short-awned. *maritimum.*

e2. Culm 50 cm. Leaf-blades 11 cm. long. Empty glumes rough. Central floriglume short-awned. *pratense.*

d2. Culm 40 cm. Spike 6 cm., with a slender rachis, easily breaking. Central floriglume and lateral empty glumes long-capillary. *jubatum.*

A3. Spikelets hexastichous, in six ranks, and all perfect. Erect annual, 70 cm. tall. Spikes 10 cm., compressed. Awns often 15 cm. Floriglume adhering to the grain. *hexastichon.*

1. H. ANDICOLUM Gris.

Cespitose perennial, with fibrous rhizome. *Culms* 20–30 cm. high; leaves plane, acuminate, glabrous. *Spike* linear, compressed, slightly

curved. *Spikelets* distichous, spreading; the sterile spikelets neutral, little shorter than the perfect. *Empty glumes* setaceous; *floral glume* oblong-lanceolate, acuminate, awnless; the *palea* linear, shortly 2-toothed.

S. Patagon and E. Fuegia (Dusén); high up in the mountains of Argentina.

H. ANDICOLA PUSILLUM.

At Puerto Madryn. (Dusén.)

2. H. CHILENSE Brongn.

Leaves short, subulate-lanceolate, erect, convolute, glabrous. *Spike* cylindrical, slender. *Glumes* subulate, subequal, scabrid. *Mid-flower* fertile, its *floral glume* lanceolate, awned, *awn* as long as the glumes. The *lateral flowers* neutral, with 1 glumelle; the inner empty glume basi-lanceolate.

(Chili); Patagon., Chubut, on dry hills; Fuegia. (Speg.)

3. H. COMOSUM Presl.

Creeping. Leaves plane; sheaths and blades pubescent. *Glumes* all setaceous, scabrid. Lateral flowers male, short-awned; mid-flower perfect, its *floral glume* 3-nerved, with rough apex and long awn.

(Chili.)

H. COMOSUM FLAVESCENS Desv.

E. Fuegia. (Dusén.)

4. H. COMPRESSUM Griseb.

Annual, ascending to 30 cm. *Leaves* plane, linear-acuminate, scabrous. *Spike* linear-compressed. *Spikelets* awnless, scabrous. Empty glumes linear-acuminate, as long as the flower in the neuter spikelets, half as long as the fertile spikelets, in these lance-linear, subpungent, exceeding the palea. *Flowers* of lateral spikelets neuter. *Ovary* apically pilose.

(Argentina); S. Patagon. in salinas by R. Sta. Cruz.

5. H. JUBATUM Linn. Squirrel-tail.

Culm to 50 cm. tall, simple, slender, glabrous. *Sheaths* lax, usually shorter than the internodes. *Spike* 8 cm. long, when ripe breaking into segments. Awns of the empty and floral *glumes* long, smooth below.

(Arctic and temperate parts of N. Amer., Brit. and Br. i, 229.)

H. JUBATUM PILOSUM Franchet.

Leaves shortly hirtellate. Empty and floral *glumes* scabrid.
Magellan, Punta Arenas; Fuegia.

H. J. COMOSUM O. Ktze.

Yellowish.
Patagon.

H. J. MEDIUM O. Ktze.

Versicolored. Awns 3–4 cm. long.
Patagon.

H. J. NORMALE.

Violaceous.
Patagon.

6. H. MARITIMUM With. (*H. chilense* R. & S. nec Brongn.)

Root fibrous, cespitiferous. *Culms* erect, 10–22 cm. high, basally geniculate, glabrous. *Leaves* narrow, glaucescent, smooth. *Spike* erect, rigid, 25 mm. long. *Lateral flowers* male, short-awned, their inner *glumes* lance-oblong at base, the other setaceous.
(Eurasia and Amer.); Argent.; Patagon.

7. H. MURINUM Linn. Wall-barley.

Cespitiferous annual with fibrous roots. *Culms* basally decumbent, becoming erect, 30 cm. high, smooth. *Spike* erect, dense, 5–7 cm. long, many-flowered; its rachis articulate, frail with rough angles. *Flowers* all awned. *Glumes* of the mid-spikelet linear-lanceolate, ciliate, of the laterals setaceous-scabrid.
(Eurasia and Amer.); Patagon.

H. M. VELUTINUM Speg.

Leaves densely velvety on both surfaces.
S. Patagon., in old cultivated lands by R. Sta. Cruz.

8. H. PRATENSE Huds. (1762). Meadow-barley. (*H. secalinum* L. 1771; *H. nodosum* L. 1762.)

Cespitose perennial with hard roots. *Culms* sterile and fertile, geniculate at base, 50 cm. high. *Leaves* usually smooth, linear, the ligules

short and rounded. *Spike* exserted, 3–7 cm. long, readily separating when ripe. *Empty glumes* all subulate, scabrous; *mid-flower* cylindrical, shortly awned.

(Eurasia; W. United States; Chili); N. Patagon.

H. PRATENSE BRONGNIARTI. (*H. secalinum chilense* Brongn. nec Desv.)

Perennial, cespitose, with hard roots, and *culms* with reticulately tunicate base; 30–45 cm. tall. Leaf-sheaths subglabrous; ligules short, rounded; *blades* smooth or with rough margin. *Spike* cylindrical, narrow, 3–7 cm. long. *Joints* of rachis equal above and below. *Spikelets* in 3's; *glumes* of lateral spikelets subulate-awned, as long as the awn of the hermaphrodite flower; the interior dilated at base, coriaceous. *Palea* 1, lanceolate, muticous; *glumes* of hermaphrodite flowers setaceous, nonciliate, often shorter than the awn. *Lower palea* lanceolate, attenuate-awned; *upper palea* lanceolate, attenuate.

(Chili); Valdivia; Chubut, on dry hills.

H. PRATENSE CHILENSE Desv.

Cespitose perennial with hard roots and basitruncate *culms*, some sterile, 30–45 cm. tall. *Leaf-sheaths* subglabrous; ligules short, rounded; *lamina* smooth or rough-edged. *Spike* cylindric-narrow, 25–75 mm. long. *Rachis-joints* equal throughout. *Spikelets* in 3's; *glumes* of lateral flowers awn-like, as long as the *awns* of the perfect flowers, the *palea* solitary, muticous.

E. Fuegia. (Dusén.)

9. H. PUBIFLORUM Hook. f. Wild-barley.

Culm to 25 cm., inclined at base, glabrous. Radical *leaves* 5 cm. long. involute; cauline leaves with long tumid striate sheaths, blades very short and subulate. *Spikes* 3–4 cm. long, tawny-purplish. Glumes all setaceous, hairy, scabrid above, 15 mm. long.

Its smaller size and purplish spikes with hairy glumes, distinguish it from *H. jubatum*. Growing wild in the hollows, it makes them purplish.

Magellan, S. Patagon., Sta. Cruz Valley (Hatcher); Fuegia.

(H. SECALINUM Schreb. = *H. pratense* Huds.)

H. secalinum Sav. = *H. maritimum*.)

10. H. VULGARE HEXASTICHON Linn.

Flowers all hermaphrodite, 6-seriate. *Spike* erect, terete, awned; the *awns* rather broad, more or less divergent, twice as long as the spike, which is 3–7 cm. long. Annual.

(Cult. in N. Hemisphere); N. Patagon. (cult.).

59. ELYMUS Linn. Wild-rye.

Culms tall; leaves flat; *spikes* dense having (1–)2–several-flowered *spikelets*, mostly in pairs, sessile in alternate notches of the rachis, with the *awned glumes* as an involucre. *Grain* adhering to the palea. (Fig. in Brit. & Br. i, 230.)

Species 30 in temperate regions. Distinguished from *Hordeum* by having 2 or more flowers in each spikelet (except *E. uniflorus*).

Key to the Species.

A. Culm thick, spikes green-violet.
  b. 75 cm. Leaves smooth, becoming convolute. Spike 8 cm. Spikelets in 2's and 3's; 3–4-flowered. Floriglume short-awned. *agropyroides.*
  b2. To 180 cm. Leaves 7 mm. broad. Spike 15 cm. Spikelets 1-flowered, 12 mm. long. Awn 17 mm. *uniflorus.*

A2. Culm leafy, sheathed to the top.
  b. Leaf-blades rough beneath, complicate. Spike 18 cm. Spikelets 18 mm., 5-flowered. Awn of floriglume 25 mm. *palenæ.*
  b2. Culms 60 cm. Leaves short, glabrous. Spike linear-oblong. Spikelets 2-flowered. Floriglumes awned, hairy above. *antarcticus.*

A3. Culms stout, 45 cm. Blades glabrous. Spike narrow, erect, long. Spikelets paired, 3-flowered. Awn short. *chubutensis.*

A4. Culms slender.
  b. Glabrous, nearly a meter tall, with innovations. Sheaths and blades long. Spike 7 cm. Spikelets 3-flowered. Empty glumes short. Floriglume awned. *albowianus.*
  b2. More or less puberulent.
    c. Culm 70 cm., sheathed half-way. Spike narrow; spikelets in 2's, 3-flowered, 2 of them fertile; leaves very narrow. Awn short. *leptostachys.*
    c2. Culm 30 cm. Spike 8 cm.; spikelets 2–3-flowered, 1–2 fertile. Awn long. *andinus.*
    c3. Culm 75 cm., naked. Leaves rigid, broad, pubescent on upper surface. Spikes 7 cm. Spikelets 3; 2-flowered. Awn short. *patagonicus.*

1. E. AGROPYROIDES Presl.

Culm erect, 60–90 cm., as thick as a goose-quill. *Leaves* ultimately convolute, smooth; ligules short, round. *Spike* 7–10 cm. long, rigid,

dense, green-violet; *joints* of rachis biconvex, subcompressed, 4–6 mm. long at base of spike. *Spikelets* in 2's and 3's, 3–4-flowered, of these 2–3 fertile. *Glumes* alike, just shorter than the spikelet, lanceolate, acuminate. *Palea* of lower flower 8–9 mm. long, the *floral glume* 2-lobed, short-awned.

(Chili); Magellan; Fuegia.

Around Ushuaia is a form with pilose sheaths and leaves.

2. E. ALBOWIANUS F. Kurtz.

Culm nearly a meter high, slender, with innovations from the rhizome. *Culm-leaves* plane, glabrous with 17 cm. long sheaths and longer blades, acuminate. *Spike* 7 cm. long, rigid, green or green-violet. *Joints* of rachis biconvex, narrowly winged; *spikelets* (sometimes in triplets) 15–20 mm. long, including awns, 3-flowered. *Empty glumes* inequilateral, shorter than the spikelets, lanceolate, subulate or awned; *floral glume* 16–18 mm., ovate-lanceolate, 2-lobed, 3 of its 5 nerves continuing into an awn.

S. Fuegia; around Ushuaia; by Rio Gallegos (Dusén); W. Patagon.

3. E. ANDINUS Trin.

Culm slender, more than 30 cm. *Leaves* narrow, sparsely pilose; ligules short, truncate. *Spike* slender, linear, 5–12 cm.; joints of rachis plane inside, obtusely 4-angled; 6–10 mm. long at base of spike. *Spikelets* in pairs, 10 mm. long, 2–3-flowered, 1 of them sterile. *Glumes* linear, 3-nerved, acuminate, awned, shorter than the spikelet. *Paleæ* of lowest flower subequal, 8 mm. long, narrow, the lower (floral glume) with awn 12–22 mm. long.

(Chili); S. Patagon., on dunes by Lago Argentino.

4. E. ANTARCTICUS Hook. f.

Culms erect, 60 cm. tall, leafy, glabrous; sheaths 12 cm. *Leaf-blades* shorter, plane, not exceeding the culms. *Spike* linear-oblong; spikelets 2-flowered. *Glumes* free to the base, lanceolate, awned-acuminate, entire or bifid. Flowers shortly pediceled; *floral glume* awned, 5-nerved, hairy upwards; *palea* 2-toothed.

One glume out of the 4 at each articulation is often bifid, the outer one on one side.

Magellan; Fuegia.

E. ANTARCTICUS FULVESCENS Kurtz. (*E. valdiviæ* Steud.)

Spike beautifully fulvescent; *sheaths* of the lower leaves pilose.

Magellan; Fuegia; Navarino I.

5. E. CHUBUTENSIS Speg.

Cespitose. *Culms* stout, 30–60 cm. tall, sheathed to the top, flaccid; sheaths glabrous; ligules very short, denticulate; *limbs* membranaceous, mediocre, subglaucescent, glabrous, scarcely subscabrous. *Spike* narrow, erect, 5–10 cm. long; *spikelets* paired; *glumes* narrow-lanceolate, acute; *flowers* 4–5, the lowest sessile, the others pediceled, the three lower fertile and with an *awn* not their own length; the uppermost one awnless and abortive.

Patagon., Chubut, in upland meadows.

6. E. LEPTOSTACHYUS Speg.

Cespitose, slender, 60–80 cm. tall; lower *sheaths* pubescent, others glabrous, more or less elongate; ligule very short, denticulate; *limbs* membranaceous-rigid, linear, puberulous on both surfaces; *culms* long, leaf-sheathed half-way, mostly naked above. *Spike* very narrow, 4–8 cm. long, erect; *spikelets* paired; *glumes* shortly mucronate-awned; *flowers* in each spikelet three, the first sessile and fertile, the second pediceled and fertile, the uppermost pediceled and sterile; *floriglumes* of the fertile flowers with an awn not their own length.

Patagon., Chubut in meadows near woods, etc.

7. E. PALENÆ Phil.

Culm sheathed to the top; sheath smooth; *leaf-blades* scabrid below, over 4 mm. broad, complicate. *Spike* 18 cm. long, 9 mm. broad, green. *Spikelets* 18 mm. besides the awn, 5-flowered; *glumes* 10 mm., awn 5 mm.; *floral glume* with awn of 25 mm. length.

W. Patagon., by Rio Palena.

8. E. PATAGONICUS Speg.

Cespitose, slender; *sheaths* short, glabrous; ligules very short, denticulate; *leaf-limbs* rigid, rather broad; pubescent on upper surface, rigid on lower surface. *Culms* long, naked. *Spike* linear, erect, 5–8 cm. long, with *spikelets* in 3's, each 2-flowered; *glumes* scarcely mucronate; one

flower sessile and fertile; *floral glume* 3-nerved, with very short *awn*, upper *palea* sterile, pediceled.

Patagon., Chubut, in upland meadows. Beautiful for its ternate spikelets.

9. E. UNIFLORUS Phil.

Culm 180 cm. tall, 4 mm. thick at its base. *Leaves* 7 mm. broad. *Spike* 15 cm. long, slender, green and violet. *Spikelets* 1-flowered, 12 mm. long; *glumes* 11 mm., nervose, short-awned. *Floral glume* ending in a 17 mm. *awn*.

W. Patagon., by Rio Palena.

60. CHUSQUEA Kunth. (of tribe *Bambuseæ*).

Woody, with leaves often small, articulating on the sheaths. Spikelets 1-flowered, variously panicled, the rachilla jointed above the lower glumes, not produced above the perfect, 3-androus flower. Empty glumes 4, the lower pair small or narrow, persisting, the upper pair like the floral glume, which is broad, 5–several-nerved, awnless. Palea as long as its glume, broad, 2-keeled upwards.

1. C. CULEOU Desv. "Culeou."

Erect, 3–4 mm. high, terminal culms robust; branches erect, 10–17 cm., fasciculate, many-leaved; leaves coriaceous, linear-elliptical, mucronate, with five primary nerves, the mid one prominent; ligule ovate-rounded. Panicle 1–2 cm. long, strict, spike-like, 1-sided. Spikelets 5–6 mm. long, obtuse; glumes slightly shorter; floral glume of the hermaphrodite flower, finely pubescent, 7-nerved, obtuse, mucronulate.

N. W. Patagon., by Valdivia, common in moist woods.

2. C. MACROSTACHYA Phil.

Leaves coriaceous, lance-linear, subulate, attenuate, the same color on both sides, mid-rib prominent. Floral glume setaceous.

W. Patagon., by Rio Palena.

3. C. PALENÆ Phil.

Branching, 14 cm. high. Leaves herbaceous, glaucous and glabrous underneath, cuneate at base, gradually ending in a long point, with no cross-veins. Floral glume very short, ovate.

W. Patagon., by Rio Palena.

4. C. QUILA Kunth. (*C. valdiviensis* Desv.) Quila.

Culm much branching. Internodes crowded, smooth. Branches fasciculately arising from the nodes, spreading, 4–5-leaved, smooth. Leaves lanceolate, 6–12 cm. by 4–6 mm., subattenuate at base and with a short petiole, glaucous-pilose underneath. Panicle 3–10 cm. long, becoming rigidly divaricate. Rachis angled, sulcate; pedicels puberulous. Spikelets ovate, shining, nervose. Empty glumes lanceolate-cuspidate, exceeding the neuter subequal flowers. Floral glume of second flower shorter than the terminal flower.

(Chili); W. Patagon. (Supra, p. 5.)

Family 11. CYPERACEÆ. The Sedges.

Grass-like or rush-like plants, usually with solid trigonous *stems* and narrow, mostly 3-ranked, *leaves* from closed *sheaths*. *Spikelets* glumiferous, each with one glume subtending 1 or rarely 2 flowers; the spikelets solitary or clustered. *Flowers* mostly diclinous with hypogynous perianth, consisting of bristles or scales, or without perianth. *Stamens* 1–3, rarely more, filaments slender. *Ovary* 1-locular, 1-ovuled; *style* 2–3-cleft or subsimple. *Achene* lens-shaped or trigonous. *Endosperm* mealy, enclosing in the center a minute embryo. The leaves are usually hard and sharp-edged and consequently unfit for fodder.

Species about 3,000, cosmopolitan, chiefly growing in damp places.

KEY TO THE GENERA.

A. Hermaphrodite; though some of the flowers may be imperfect.
Bristles or scales mostly representing a perianth.
b. Spikelets numerous.
Perianth-bristles 6, feathery, persisting. Spikelets 1–2-flowered. 1. *Carpha.*
Perianth none. Glumes 2-ranked. 2. *Cyperus.*
Perianth-bristles 6, or 1, or 0. Glumes spirally arranged. 3. *Scirpus.*
bb. Spikelet 1, terminal.
Several-flowered. Styles thickened, forming a rostrum on the achene.
Perianth-bristles 3–8, mostly 6. 4. *Heleocharis.*
Perianth none. Stamens 1–3. (*Fimbristylis* p. p.) 5. *Stenophyllus.*
1-, rarely 2-flowered. No rostrum. Leaves 2-ranked. 6 perianth-scales. 6. *Oreobolus.*
bbb. Spikelets panicled, few-flowered, with two-ranked glumes.
Perianth of 6 setæ or none. Achene obtuse, drupe-like. 7. *Elynanthus.*

AA. Diclinous. Perianth none; but achene enclosed in a utricle.

b. Spikelets monœcious, the male spikelets above, many-flowered; the females below in the same spike, 1-flowered. Floral axis prolonged, often hooked. 8. *Uncinia.*

bb. Spikelets monœcious or dicœcious, all 1-flowered, each in the axil of a glume, forming male and female or androgynous spikes. 9. *Carex.*

1. CARPHA R. Br.

Low, grass-like, with *leaves* crowded at the base, and many *spikelets* in a terminal inflorescence with a few long leaf-like *bracts*. *Spikelets* narrow, 1–2-flowered. Hypogynous *setæ* 6, plumose, persisting like a pappus. *Style* 3-branched. *Achene* 3-angled.

Species 2, *C. alpina* R. Br. in Austral., Tasm. & N. Zeal., and the following:

C. SCHŒNOIDES Banks & Sol.

Culms cespitose, to 2 cm. tall, terete, smooth. *Leaves* half as long, semiterete. *Spikelets* about 2-flowered, in a few-spiculate panicle.

(Chili); Patagon., Eden; N. and S. Fuegia, on hills; Desolation I. in W. Magell. (Dusén.)

FIG. 44.

Carpha schœnoides. Spikelet and fruit. (From *Flora antarctica.*)

2. CYPERUS Linn.

Culms leafy near the base, with one or more involucrate leaves under the inflorescence. Spikelets mostly flat, in umbellate spikes or heads; at least two of their flowers perfect; their scales 2-ranked. Perianth none; stamens 1–3. (Brit. & Br. i, 235.)

Species 400, in tropical and subtropical regions, chiefly in moist places and near water.

KEY TO THE SPECIES.

a. Culm triangular.

b. Umbel 1–5-rayed. Bracts 3–4. Achenes fuscescent, punctulate. Awns uncinate. *aristatus.*

b2. Umbel few-rayed. Bracts 3. Achenes dark-chestnut, punctulate. Culms short; spikes compound. *pœppigii.*

b3. Umbel 5–8-rayed, rays very short. Bracts 4. Achenes compressed, punctulate. Sides of scales dark- or blood-chestnut. *melanostachyus-variegatus.*

b4. Umbel 12-rayed. Bracts 6–8. Achenes brown. Tall, with long leaves. *vegetus.*

*a*2. Culm triangular-filiform. Umbel 2–3-rayed. Bracts 2. Achenes blackish. Scales yellowish. *flavus.*

*a*3. Culm compressed. Head lax, 2-bracted. Achenes biconvex. Awn straight, quadrangular. *cimicinus.*

1. C. ARISTATUS Rottb.

Root fibrous, slender, cespitiferous. *Culms* triquetrous, erect, 14 cm., glabrous. *Leaves* linear, carinate, as long as the culm. *Umbels* 1–5-radiate; *rays* unequal, polystachyous; *spikelets* fasciculate-capitate, 8–15-flowered; heads oblong or elliptic-globose. *Involucre* 3–4-leaved, very long; leaves 7–9-nerved, acuminate, awned, the *awns* uncinate, yellow-green; *achene* oblong, triangular, apicate, fuscescent, finely punctulate, one third as long as the scale.

(Orient, Africa, Chili); N. Patagon., in Isla de Crespo, Rio Negro.

2. C. CIMICINUS Presl. (*C. lorentzianus* Bcklr.)

Rhizome small, fibrous. *Culms* 1–few, 15 cm. high, compressed, few-leaved. *Leaves* shorter than culm, complicate, spinulose-toothed. *Head* solitary, lax, with 2-leaved *involucre*. *Spikelets* 5–16, diverging, moderately compressed, linear-oblong; *scales* with lucid castaneous sides; *fruit* minute, scarcely half as long as the scale, compressed-biconvex, obovate, umbo-articulate, reticulate; *rachilla* straight, quadrangular.

(Argentina); N. Patagon., in wet parts along Rio Negro, near Carmen.

3. C. FLAVUS Presl.

Roots fibrous, cespitiferous. *Culms* triangular-filiform, 30 cm. high, leafy at base. *Leaves* very narrow, half as long as the culm. *Involucral* leaves 2, filiform, divaricate, exceeding the simple, 2–3-rayed umbel, with 2–3 spikes, having 14–18-flowered linear-lanceolate, divaricate spikelets. *Scales* ovate-obtuse, 3-nerved, yellowish. *Achene* obovate, subglobose, punctulate, blackish.

(Mexico; Brazil; Argent.); Patagon.

4. C. MELANOSTACHYUS VARIEGATUS Knth.

Style bifid. *Root* fibrous. *Culms* cespitose, ascending, 10 cm., *triquetrous*, leafy at base. *Leaves* plane, linear, glabrous, shorter than the culm. *Umbel* 5–8-rayed, dense with very short rays; *umbellules* 4–6-stachyous; *involucre* about 4-leaved, much exceeding the umbel. *Spikelets* ovate-

lanceolate, acute, sessile, 11–15-flowered; *scales* ovate, obtuse, muticous, carinate-navicular, dorsally 5-nerved, olivaceous, and croceous-punctulate, the sides dark or sanguineous-castaneous; keel green, shining. *Achene* ovate-oblong, compressed, apicate, punctulate, half as long as the scale.

(Mexico); N. Patagon., in swamps near Carmen and Tres Cerros.

5. C. POEPPIGII Knth.

Culms cespitose, short (5 cm.) *triangular*, with leafy base. *Leaves* plane, linear, scabrid on margin, exceeding the culm. Involucre 3-leaved, long. *Umbel* simple, few-rayed, fasciculately crowded; *rays* very short, polystachyous; *spikelets* on the rays arranged in compound spikes, linear, compressed, flexuose, about 4-flowered. *Scales* remote, ovate-elliptical, apically rounded, carinate, 7-nerved, dorsally rusty-lined, laterally hyaline-pale. *Achenes* oblong-linear, trigonal, slightly arcuate, mucronate, punctulate, black-castaneous, shining, shorter than the scale.

(Chili.)

C. POEPPIGII PALLESCENS Kurtz.

Pallid-green; the *scales* mostly 1-colored.

N. Patagon., in swamps near Carmen. Pale green plant.

6. C. VEGETUS Willd.

Culm 60–120 cm. tall, trigonal; leaves as long or longer. Umbel 12-rayed; involucre 6–8-leaved, very long. Heads many-spiculate, subglobose. Spikelets 20–40-flowered; scales a third shorter, ovate, acute, 3-nerved, areolate, green or yellowish. Stamen 1. Achene obovate, punctulate, shining brown, trigonal, mucronate, half as long as the glume.

(Chili); Valley of Rio Negro, N. Patagon. (Roca Exp. and J. Ball.)

3. SCIRPUS Linn. Bulrush.

Large or small "sedges" with leafy culms or leafless except the basal sheaths. Scales of the spikelets imbricated all round. Flowers usually perfect; perianth of 6–1–0 bristles. Style not swollen at base. Achene trigonal or lenticular.

Species 200, cosmopolitan.

KEY TO THE SPECIES.

A. Spike solitary.

b. Culm short; root creeping. Spike ovate, few-flowered. Scales ovate, rusty to straw-white. Setæ 6. Style trifid. *albibractcatus.*

*b*2. Culms numerous, cespitose; sheaths mucronate. Spike ovate-oblong to linear. Scales black-purple with green keel. Setæ none. *cernuus.*

*b*3. Culm filiform. Spike oval, compressed. Scales with purplish margin. Setæ 6, two of them shorter than the striate achene. *retroflexus.*

*A*2. Cespitose. Culms filiform, 1-leaved at base, glabrous. Spikes 1–2 (rarely 3–4). Involucre 1-leaved, exceeding the spikes. Scales with white sides having a purple spot. *setaceus.*

*A*3. Unequally umbelliform.

b. Root creeping. Culm tall, leafy below; leaves flat, as long as the culm. Involucre 3–4-leaved. Spikes several, oblong. Scales ovate, bifid, midnerve mucronate-awned. Setæ 2–6, barbed, or none. *maritimus.*

*b*2. Cespitose, tall. Culm filiform, leafy below. Leaves setaceous. Involucre 3-leaved, shorter than the depauperate, 3–5-leaved umbel. *juncoides.*

*b*3. Culm subtrigonal, striate. Involucre 2-leaved, the outer pungent. Umbel many-rayed. Scales elliptical-round, mucronulate. Setæ 2, barbed. *riparius.*

*b*4. Culm leafless, 25 mm. high. Spikes 1–3 in a bracted head. Setæ 6, retrorsely barbed. *deserticola.*

*A*3. Spikes several, bract 1, exceeding them. Scales brown.

b. Culms sharply 3-angled. Scales awned. Setæ 2–3, retrorsely barbed, not exceeding the plano-convex achene. *americanus.*

*b*2. Culms slender, flattened above. Scales acute. Setæ 3, retrorsely barbed, not half as long as the plano-convex achene. *nevadensis.*

*A*4. Spikes in a decompound umbel, with unequal rays. Bracts 3–4. Scales recurved mucronate. Setæ 6, retrorsely barbed. *glaucus.*

1. S. ALBIBRACTEATUS (Nees & Mey. sub *Eleocharis*) O. Ktze.

Root creeping. Culms very short, 25–40 mm. long, setaceous, striate, tetragonal, recurved. Spike ovate, few-flowered; its scales ovate, obtuse, carinate, the sides rusty-red, or all straw-white; the lowest sterile. Setæ 6, whitish. Style trifid. Achene lenticular, punctate-striate, with yellow base, crowned by the persisting style.

(Peru); Patagon.; N. and E. Fuegia.

2. S. AMERICANUS Pers. Three-square.

Perennial by long rootstocks. Culm triquetrous, erect, to one meter tall. Leaves 1–3, narrow, keeled, shorter than the culm. Spikelets oblong-ovoid, in heads, as if lateral. Involucral leaf slender. Scales broad-ovate, brown, emarginate, awned. Setæ 2–6, retrorsely barbed. Stamens 3. Achene plano-convex.

W. Patagon., wet elevations by Rio Aysen.

3. S. CERNUUS Vahl. (including *Isolepis magellanica* Gaud.).

Root fibrous; *culms* numerous, cespitose, 25–40 mm. high. angulate, capillary. *Sheaths* one third as long, ending in a mucro. *Spike* solitary, ovate-oblong to linear, obtuse, many-flowered. *Scales* ovate, the lowest acute, the others obtuse, black-purple with green keel. *Setæ* none. *Achene* obovate ("triquetrous," Speg.).

(E. Hemisphere); Magellan; rather common in Fuegia.

S. CERNUUS PYGMÆUS (Kunth sub *Isolepis*).

Scales carinate-navicular, broad, obtuse, mucronulate, their sides hyaline-white. *Achene* subrotund, flat inside. No perianth-bristles.

S. Patagon., Beagle Channel. (Dusén.) "Has two forms, *brevis* and *elongatus*." (Wiegarht.)

4. S. DESERTICOLA Phil.

Creeping, cespitose; *culms* covered by castaneous sheaths, 25 mm. high, leafless. *Leaves* rosulate, plane, striate. *Spikes* 1–3, forming a terminal head. Lower bracts ovate, 5-nerved, apically coriaceous, greenish, equalling the head; others shorter, narrower, scarious. *Setæ* 6, hypogynous, retrorsely hispid. *Achene* ovate, triquetrous, acuminate, smooth, scarcely half as long as the scale.

(Desert of Atacama; Mendoza); S. Patagon. by Rio Chico.

5. S. GLAUCUS Nees.

Glaucous. *Culm* triangular, glabrous, leafy below, rough on the angles at the top. *Leaves* plane, carinate, scabrous on the angles and margin, almost equalling the culm. *Involucre* 3–4-leaved, longer than the supra-decompound cymiform *umbel*. *Rays* very unequal; raylets apically 1–5-ranked, cylindraceously oblong. *Scales* carinate, oblong, apically recurved-mucronate and ciliolate, fuscescent with a green keel. *Achene* round-elliptical, attenuate, long-mucronate. *Setæ* 6, retrorsely spinulose.

(Chili); Patagon., Neuquen, in damp places.

6. S. JUNCOIDES Willd. (*Isolepis juncifornis* H. B. & K.)

Culm cespitose, tall, 45 cm., strict, filiform, striate, rigid, glabrous, leafy at base. *Leaves* setaceous, canaliculate, shorter than the culm. *Involucre* 3-leaved, shorter than the depauperate 3–5-rayed *umbel;* the

rays unequal, 1, rarely 2- or 3-headed, the heads globose, many-spicate; the *spikes* ovate; scales carinate-navicular, 3-nerved, brownish. *Achene* trigonal-obovate.

(Brazil, etc.); N. Patagon.

7. S. MARITIMUS Linn.

Root creeping. *Culm* stout, 30–90 cm. tall, trigonal, erect, glabrous or scabrous on the angles upwards, leafy below. *Leaves* flat, linear, as long as the culm, rough-edged. *Involucre* 3–4-leaved, 1 or 2 leaves longer than the others. *Umbel* simple, few-rayed, the rays unequal or all short. *Spikes* oblong, 6–18 mm. by 4–6 mm., many-flowered. Scales ovate, apically bifid, acuminate, mid-nerve excurrent-awned, brown-rusty. *Achene* obovate plano-convex, finely tuberculate. *Setæ* 2–6, short, retrorsely spinulose, or none.

(Cosmopolitan); N. Patagon., "common at Tuy and elsewhere. Sometimes used for thatching." (J. Ball.) At Rio Chico de la Sta. Cruz, by J. B. Hatcher; in fruit, March 24, 1897.

8. S. NEVADENSIS S. Wats.

Stems clustered from a running rootstock, 30–60 cm. high, slender, leafy at base, somewhat flattened above. *Leaves* nearly as long, channeled or revolute, rough on margin, acute. *Spikelets* 1–8, ovate-oblong, acute, 8–20 mm. long, in sessile clusters, subtended by a single, erect, involucral leaf. *Scales* brown, shining, ovate, subcarinate, acutish. *Setæ* 1–3, retrorsely barbed, not half as long as the broad-ovate, plano-convex, acute *achene*, 2 mm. long. Style 2-cleft.

(Nevada); S. Patagon., in wet salinas near Rio Chico.

9. S. RETROFLEXUS Poir. (*S. setaceus* Nees non L., *Heleocharis chætaria* R. & S.)

Culm filiform, glaucous. *Spike* solitary, compressed, oval. *Scales* obtuse, their margin thin-purplish, dorsally green-carinate; the 2 lower subequal, shorter than the spikelet. *Setæ* 6, brownish, 2 of them shorter than the obovate, trigonal *achene*, which is punctate-striate, with rostrum dilated.

(East Indies); N. Patagon.

10. S. RIPARIUS Presl.

Culm obtusely trigonal, finely striate. *Involucre* 2-leaved, the outer *leaf* straight, pungent, continuing the culm, shorter than the umbel, the inner leaf still shorter. *Umbel* many-rayed, its rays trigonal. *Bracts* lanceolate, 1-nerved. *Spikes* ovate-oblong, many-flowered. *Scales* elliptical-round, 1-nerved, emarginate-mucronulate. *Setæ* 2, retrorsely scabrid. *Style* bifid. *Achene* obovate, plano-convex.

(Calif. to Chili); N. Fuegia, rare, Dusén; abundant on the banks of Lago Nahuel-huapi.

S. RIPARIUS TERETICULMIS Steud.

Approaching *S. americanus* by its more or less terete, flavescent *culms*, 25–75 cm. high, finely striate, its depauperate *umbel*, about 6-rayed, its sanguineous *bracts*, its smaller dark sanguineous *spikes*, its broad-ovate, long-awned *scales*. *Style* long, bifid.

S. Patagon., by banks of Pavon I., in Rio Sta. Cruz, and Lago Argentino.

11. S. SETACEUS Linn. p. p.

Culms cespitose, filiform, 1-leaved at base, glabrous; the *leaf* linear-filiform, shorter than the culm. *Spikes* solitary or in pairs, rarely 3 or 4, ovate, obtuse, few-flowered. *Involucre* of 1 leaf, exceeding the spikes. *Scales* ovate, submucronate, green at the keel, hyaline-white with a purple spot at each side. *Achene* round-elliptical mucronate, its sides ribbed lengthwise and striate across.

(Eurasia, Austral., Chili); Magellan.

4. HELEOCHARIS (*Eleocharis*) R. Br. Spike-rush.

Sedges with simple *culms*, the *leaves* usually reduced to sheaths. *Spikelet* solitary, terminal, erect, many-flowered, not involucrate. *Scales* concave, imbricated spirally. *Perianth-bristles* 1–8, retrorsely barbed, or none. *Stamens* 2–3. Style 2–3-cleft, its base enlarged and persisting as a rostrum on the lenticular or trigonal *achene*.

Species 80, cosmopolitan, from tropics to the arctic regions.

KEY TO THE SPECIES.

a. Style usually 2-cleft.

b. Low, creeping by thick rootstock. Stylo-base constricted. Setæ none–3. *funebris*.

b2. Creeping horizontally; stout. Achene with flat rostrum. Setæ 4 or none. *palustris*.

*b*3. Slender. Spike oval, 1-bracted. Achene 2-edged. *uniglumis.*
*b*4. Style bifid or trifid. Setæ rigid, persisting. Bulb rugose. Spike terminal. *sulcata.*

*a*2. Style 3-cleft.
b. Stems minute, setaceous. Flowers distichous. Setæ 2–4. *acicularis.*
*b*2. Stems filiform.
c. Spike solitary, bractless, dark purple. Achenial bulb conical. Setæ 3–4–(6). *melanocephala.*
*c*2. Spike sublateral, with bract-like scale. Style trifid less than half-way; bulb as broad as the achene. *pachycarpa.*
*a*3. Achene transversely striate. Culm triangular-filiform. Setæ 3–4. *striatula.*

1. H. ACICULARIS Roem. & Sch.

Stems setaceous, almost round; sheaths leafless. Spike ovate, acute. Glumes equal, acute. Stigmas 3. Setæ 2–3.

H. ACICULARIS LILLIPUTIANA Speg.

Cespitose, with small *culms*, 5–10 mm. long, quadrangular, green, purplish-sheathed at base; *spikes* acrogenous, 4–7-flowered, flowers distichous, *scales* ovate-elliptical, obtuse, entire. *Setæ* 4, retrorsely spinulose.

Patagon., in river swamps near Golfo de San Jorge.

2. H. FUNEBRIS Speg.

Rhizome thick, creeping. *Culms* low, densely fasciculate-cespitose, the fertile and sterile intermixed; terete or subangulate, scarcely sulcate, smooth, green, leafless, sheathed at base; *sheaths* wine- or dark-purple-colored below, pallid upwards, obliquely truncate and submucronulate. *Spike* strictly acrogenous, fusoid-subovate, many-flowered; *scales* ovate, acutish, obsoletely 1-nerved, often dorsally green and marginally dark-purplish. *Stamens* 3, minutely mucronulate, with none–3 slender, retrorse setæ, just surpassing the ovary. *Style* cleft from the middle, moderately bulbose-thickened at base. *Achene* obovate, ventrally flat, dorsally convex; stylar-bulb persisting with a constriction below, fuscous-yellow, smooth, or obsoletely reticulate-punctulate.

S. Patagon., in swampy elevations near Rio Carren-leofú.

3. H. MELANOCEPHALA Desv.

Small, handsome, creeping, with filiform *culms*, 2.5–5 cm. high, strict, often curved, leafless, sheath purple. *Spike* black-purple, solitary, bract-

less, ovate-acute, 3–7-flowered. *Scales* ovate-obtuse, concave-carinate, 1-nerved, never green nor reaching the apex. *Setæ* 3–6, shorter than the achene. *Stamens* 3, anthers linear, obtusely appendaged. *Style* apically 3-cleft, its divisions thick. *Achene* half as long as the scale, triangular, obovate-elliptical, punctulate. *Tubercle* conical.

(Andes); S. Patagon, along Rio Sta. Cruz, in swamps.

4. H. PACHYCARPA Desv.

Creeping. *Culms* filiform, erect, quadrangular, 7–25 cm. high, *Spike* sublateral, many-flowered, ovate-obtuse with lower scale ovate-acute, bract-like. *Scales* ovate, subcarinate, lax, 1-nerved, black-sanguineous, scarious on margin and top. *Style* trifid less than half way, its divisions thick. *Achene* trigonal, thick, lutescent, truncate. *Tubercle* very large, conical, mostly broader than the achene.

(Chili); a form in S. Patagon. (by O. Nordenskjöld).

5. H. PALUSTRIS R. Br.

Culm stout, nearly terete, striate, about a meter tall. *Spike* thicker than the culm, oblong-lanceolate, many-flowered. *Scales* white-bordered, with green keel. *Bristles* usually 4, sometimes none. *Achenes* narrow-obovate, rostrum flattened.

(Eurasia; N. Amer., Brit. & Br. i, 251.) Patagon. by Rio Chico and Carren-leofú; Falklands.

6. H. STRIATULA Desv.

Creeping. *Culm* erect, flaccid, 7–20 cm. high, filiform, quadrangular, smooth, sheathed at base, leafless. *Spike* several-flowered, lanceolate, elongate. *Scales* ovate, concave, obtuse, dorsally green, laterally blood-red, 1-nerved, the nerve not to the apex. *Setæ* 3–4. *Stamens* 3, anthers long, obtusely mucronate. *Achene* elliptical, costate, transversely striate, pallid, with a small conical tubercle on top.

(Chili); S. Patagon., by Rio Sta. Cruz.

7. H. SULCATA Nees.

In the group having the perigynial *setæ* rigid, persisting; *style* bifid or trifid; bulb or stylobase suberose, rugose, persisting, Achene obovate, biconvex. Spicule solitary, terminal.

(New Mexico.)

H. SULCATA FILICULMIS (Schrad.) Kurtz.

N. Patagon., swamps near Carmen.

8. H. UNIGLUMIS Link.

Culm from a stoloniferous base, erect, gracilescent, scarcely exceeding 30 cm.; *sheaths* apically ustulate, lacerous. *Spike* oval, bract single, subrotund, with its base embracing the whole spike. *Scales* oblong, rather obtuse, fuscescent, with a green keel. *Achene* 2-edged; *style* bifid, with a very thick base, not corrugate.

(Eur.; N. Amer.); S. Patagon., swamps between S. Julian and Rio Deseado.

5. STENOPHYLLUS Raf.

Annual sedges, with slender, erect *culms*, and basal linear-filiform *leaves* having hairy sheaths. *Spikelets* in umbels or heads, or solitary, with a 1–3-leaved *involucre*, and scales oblong, spirally-imbricated. *Perianth* none. *Stamens* 2–3. *Style* 2–3-cleft, its base persisting as a tubercle on the trigonal *achene*.

Species 20, in warm and temperate regions.

S. CAPILLARIS (L. sub *Scirpus*) Brit. (Gray sub *Fimbristylis*).

Culms 15 cm. high and *leaves* tufted, filiform, shorter than the culms. *Spikelets* several or only 1, often panicled, ovoid-oblong. *Stamens* 2; styles 3-cleft. *Achenes* yellow-brown, wrinkled across, larger upwards.

(N. and trop. Amer., Brit. &. Br. i, 258); N. Patagon.

6. OREOBOLUS R. Br.

Dwarf cespitose, with distichous *leaves* and a single 1-flowered terminal *spikelet* (rarely 2 spikelets) terminating the erect peduncle. *Glumes* 3. *Perianth* represented by 6 narrow, rigid, subequal, hypogynous scales, which persist like a pappus. *Achene* smooth, ovoid, with no rostrum.

Species 3, in S. Austral., Tasman., N. Zeal., Hawaiian Is., S. Amer.

1. O. OBTUSANGULUS Gaud. (*O. pumilio* R. Br.)

Culm sharply trigonal, covered below; the *leaves* linear. *Scape* axillary, short, compressed, 1-flowered.

(N. Zeal., Tasman., S. Austral., Chili, etc.), W. Magellan, Port Eden; Fuegia to Cape Horn; at Packewaia in Beaver Ch.; Staaten I.; Falklands, abundant.

(Fig. G–H in Engl. & Pr. ii, 2, 114.)

7. ELYNANTHUS Nees.

Low or rush-like, with narrow leaves and few-flowered spikelets, the upper flowers male, the lateral hermaphrodite; several sterile scales distichously imbricating the base of the spikelets, which form a close or lax panicle. Stamens 3, rarely more, to 8. Style 3-branched, broad at base. Achene broadly ellipsoid, obtusely triangular, the angles costate.

Benth. & Hook. Gen. Pl. iii, 1063, distinguish these from *Schœnus* by their terminal panicles, non-flexuous rachis, habit and nut.

Species 30, chiefly in S. Afr., with scattered species in S. Austral., New Zeal., and extra-trop. S. Amer.

1 E. ANTARCTICUS (Hook. f. sub *Chætospora*).

Culm cespitose, terete, leafy at base, leaves narrow-linear, rigid, scarcely equalling the culm, semiterete, glabrous. Spikelets 1-flowered; about 6 of them in a short panicle, shorter than the 5-leaved involucre. Scales distichous, keeled, unbearded. Setæ 6, capillary, exceeding the achene.

(Mts. of S. Chili); Cape Tres Montes; N. & S. Fuegia; W. Magellan. (Dusén.)

FIG. 45.

Elynanthus laxus. Inflorescence, spikelet and achene. (After Franchet.)

2. E. LAXUS (Hook. f. sub *Chætospora*).

Culm 30–60 cm. tall, cespitose. Leaves about as long, only 1 mm. wide, striate, margins serrulate. Panicle lax, 6 cm. long, with longer bracts, the pedicels 1-spiculate. Spikelets 2-flowered, with 5 scales, the highest with a male, the next with a

perfect flower. Perianth of 4–6 setæ, persisting, and exceeding the achene.

(S. Chili.) Patagon.(?).

3. E. SODALIUM (Hariot) Franchet.

Culm 30 cm. tall, the leaves shorter, their apex pungent, their sheaths and the scales of the 1-flowered spikelets black. Panicle contracted, 10–12-spiculate. Perigonial setæ (12?), slender, persisting, exceeding the ovate achene and its 3-branched style.

Fuegia, forming peat near Cape Horn, and subalpine in Navarino I. in Beagle Ch.

8. UNCINIA Pers.

Spike simple, terminal, monœcious, its scales imbricated with numerous *male flowers* in each of the upper scales, and solitary *female flowers* in the lower. *Scales* not keeled; the *achene* enclosed in a utricle, at the base of a slender axis which usually protrudes as a "*seta*" or "awn" and usually ends in a hook.

Species 30, mostly southern, in Austral. and N. Zeal.; one in Fernandez; and the following.

KEY TO THE SPECIES.

A. Smooth.

b. Culm thick at base; leaves longer, linear. Awn-protrusion as long as the utricle.

c. 7 cm. Scales whitish. Awn-extension reddish, ciliate-edged. *phleoides.*

c2. 60 cm. Scales white-margined. Utricle shining. *macrophylla.*

b2. Culm slender, 90 cm. tall. Leaves large, flat. Spike large, cylindrical; scales white-margined upwards. Awn-protrusion half as long as the apically pilose utricle. *cylindrica.*

b3. Culm stoloniferous, crowded-leafy at base. Scales hyaline-margined.

c. Leaves setaceous, shorter than the culms. Awn straight. *microglochin.*

c2. Leaves narrow, plicate. Awn-protrusion (twice?) as long as the utricle, yellow. Culm 20 cm. *sinclairii.*

A2. Smooth, save the scabrid edges and mid-nerves of the leaves.

b. Cespitose, creeping, 7 cm. Leaves narrow, involute. Spike capitate, naked. Scale lanceolate, pale-nerved. Awn-protrusion half as long as the utricle. *kingii.*

b2. Culm simple, 30 cm. tall, leafy below. Leaves linear. Spike 1-bracteate. Scale-margins rusty. Awn-protrusion as long as the rough-edged utricle. *macloviana.*

b3. Root thick; culm 45 cm. high. Leaves plane, flaccid, as long as the culm. Spike lax. Scale-margins brown, smooth. Awn-protrusion as long as the apically setulose utricle. *lechleriana.*

b4. Robust; culms 75 cm. tall. Leaves broad-linear, as long. Spike thick, cylindrical. Awns 6 times as long as utricles, projecting all around. *macrotricha.*

*A*3. Scabrid.

b. Culm 30 cm., leafy below, rough above. Leaves shorter, linear. Spike lax, depauperate. Scales marginally white-hyaline, glabrous. Awn-protrusion twice as long as utricle. *tenuis*.

*b*2. Culm 36 cm. tall, leaf-remains at base. Leaves as long, flat. Spike with 3 bracts. Scales pale-fuscous, 7-nerved. Utricle lanceolate, glabrous. Style thickened at base. *bracteosa*.

*b*3. Culm 60 cm., filiform, sheathed at base. Leaves shorter, flat. Scales sanguineous. Awn-protrusion as long as the utricle. *triquetra*.

1. U. BRACTEOA Phil.

Culm 36 cm. tall, scabrid above, base with remains of old leaves; *leaves* as long, 4 mm. broad. *Spike* oblong, 40 by 15 mm., lax, with 3 involucral leaves, one of these 3 times its length. *Female* scales spreading, lance-ovate, the lowest 10 mm. long, pale-fuscous, dorsally green, 7-nerved. *Utricle* lanceolate, glabrous. *Achene* ovate-oblong, truncate; style thickened at base.

Smith Channel of W. Patagon.

2. U. CYLINDRICA Franchet.

Culm 90 cm. tall, slender, smooth; *leaves* large and flat, 6 mm. broad. *Spike* 10 cm. long, slender, cylindrical, shortly male at the obtuse apex. *Scales* firm, concave-ovate, glabrous, white-margined upwards. *Utricle* oblong-fusiform, obtuse, many-nerved on the convex back, ventrally plane, pilose at top and on margins, equalling the scale, 5 mm.; *awn* a half longer. (Fig. 47, right side, p. 271.)

Fuegia, Molyneux Harbor, in woods.

FIG. 46. *Uncinia kingii*. Spike and spikelet showing its scale, utricle, and awn. (From *Flora antarctica*.)

3. U. KINGII Boott.

Cespitose, root creeping; *culm* 8 cm. high. *Spike* capitate, naked. *Utricle* lanceolate, narrowing upwards, its mouth truncate, obliquely cleft, its surface ferruginous, smooth, exceeding the pale-nerved lanceolate scale. *Awn* half longer than utricle. (Fig. 46.)

W. Magellan, S. Fuegia, alpine by Rio Grande on Beagle Ch. (Dusén); at Port Cook (Speg.).

4. U. LECHLERIANA Steud.

Root fibrous, thickened. *Culm* erect, round-angular, 45 cm. tall, sheathed below. *Leaves* as long, flat, margins rough. *Spike* lax, with leafy scales at base, attenuate, male above. *Scales* oblong, obtuse, pale, the edge brown, glabrous, exceeding the oblong-triquetrous, apically setulose utricle. *Awn* hooked, exserted part as long as its utricle.

Magellan, Fuegia, on Beagle Channel.

5. U. MACLOVIANA Gaud.

Culm simple, erect, 30 cm. high, trigonal, glabrous, the base leafy. *Leaves* plane, erect, rigid, linear, rough inside and on edges. *Spike* slender, erect, cylindrical, 4–5 cm. long, with a basal setiform leaf. *Utricle* lance-oblong, plano-convex, 1-nerved, the angles ciliate-rough, equalling the obtuse scales. *Awn* twice as long, hooked.

(Montevideo); Magellan; Falklands; Fuegia, near woods.

U. MACLOVIANA MONTANA (Phil.).

Smaller than *U. macloviana* Gaud., its leaves shorter, subapically toothed. Spicule extremely attenuate, 18 mm. by 2.5 mm. Scales similar in male and female, orbiculate-ovate, utricle oblong-oval.

S. Fuegia. (O. Nordenskjöld.)

6. U. MACROPHYLLA Steud.

Root very fibrous, its neck thickened by sheaths of old leaves. *Culm* erect, triquetrous, smooth, glabrous, firm, leafy at the base, 60 cm. high. *Leaves* plane, 2–4 mm. broad, and much overtopping the culm, acuminate. *Spike* cylindric, 7 cm. long, by 12 mm. thick, naked at base, apical cone male. *Scales* fuscous, with whitish margin, the lower exceeding the obtusely triquetrous, oblong, shining utricle. *Seta* uncinate, the exsert part as long as the utricle.

(Chili); W. Patagon.

7. U. MACROTRICHA Franchet.

Culm robust, 75 cm. tall, trigonal, rough-edged. *Leaves* as long, broad-linear, smooth save on margin. *Spike* thick-cylindrical, attenuate upward, acute. *Scales* oblong, obtuse, half as long as the utricles, pallid.

Utricle gray, broad-obovate, rostrate, incurved-refract in middle. *Awn* 6 times as long, hooked, extending outwards. (Fig. 47, left side.)

Patagon., Otway.

8. U. MICROGLOCHIN (Wahl. sub *Carex*) Sprengel.

Rhizome stoloniferous. *Culm* 10–15 cm. high, smooth, terete, sulcate, leafy at base. *Leaves* strict, setaceous, much shorter than culm. *Spike* naked, 1 cm. long; male part 5–6-flowered; female part 4–12-flowered. *Scales* oblong, at length-chestnut-colored; the dorsal nerve clearer, margin hyaline; *scales of female* flowers ovate-oblong, obtuse, soon deciduous, involving the utricles, which are 5 mm. long, green, becoming brown, terete. *Achene* with a straight, setaceous, exsert awn. Stigmas 3.

(Arctic and alpine parts of N. Hemisphere); Fuegia to Cape Horn.

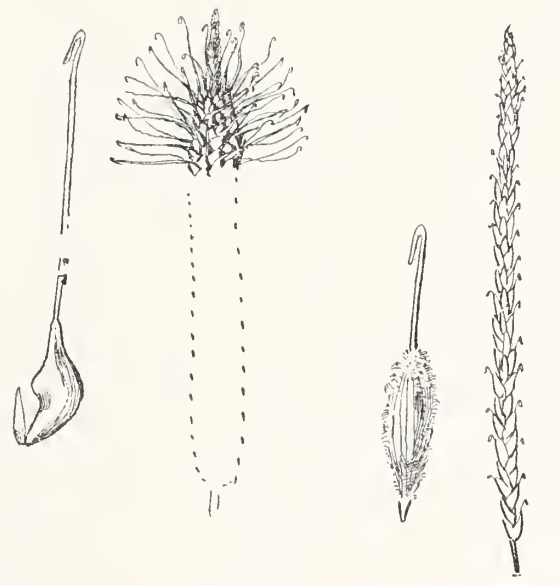


FIG. 47.

Uncinia macrotricha (2 figures on left), top of spike and achene; *Uncinia cylindrica* (2 figures on right), spike and utricle. (After Franchet.)

U. MICROGLOCHIN FUEGIANA (Kükenthal). (*Carex oligantha* Boott. non Phil., etc.)

Taller and stouter. *Spike* few-flowered, about 2–3 male flowers and 3 females. *Utricles* 6 mm. long, deflexed. *Stipe* more conspicuous.

S. Patagon.; W. Magellan, Fuegia to Orange Harbor and Horn I.

9. U. PHLEOIDES Pers.

Culm thick at base, smooth, 7 cm. high. *Leaves* longer, broad-linear. *Spike* 10 cm. long, pallid, basiattenuate. *Scales* lax, the female obovate, whitish, rusty-zoned. *Utricle* 8 mm. long, oblong-linear, attenuate both ways; its edges ciliate. *Awns* 6 mm. long. Achene obtuse-angled, pale.

(S. Chili; "Quin-quin"); Patagon.(?)

U. PHLEOIDES BRACHYTRICHA Speg.

Leaves scarcely equalling the culm, plane or plicate, not scabrid. *Culms* scarcely leafy at base. *Awn* slightly exsert, 10 mm. long.

Patagon., Chubut.

U. PHLEOIDES LONGISPICA Franchet.

Culms 30–60 cm. tall, glaucescent. *Leaves* exceeding 30 cm., by 8 mm. broad. *Spike* dense, from a linear, attenuate base, with clavate apex, 9–18 cm. long. *Utricle* red-tomentose above.

S. Patagon., Otway.

10. U. SINCLAIRII Boott.

Rhizome stoloniferous. *Culm* 5–25 cm. high, rather curved, smooth, obtuse-angled. *Leaves* crowded at base, narrow, plicate. *Spike* narrow-oblong, 1–2 cm. long, rather dense; *male* part the shorter; *female* scales ovate, obtuse, straw-brown, dorsally many-nerved, margin hyaline. *Utricle* just exceeding the scales, 4 mm. long, ovate, attenuate both ways; hispid next the short rostrum. *Achene* ovate, trigonal. *Awn* yellow, twice as long as the utricle.

(New Zealand); Fuegia by Rio Azopardo. "The Fuegian plant has taller culm and shorter male part of the spike than the N. Zeal. plant." (Dusén.)

11. U. TENUIS Poeppig.

Creeping, slender; *culm* leafy at base, rough at top. *Leaves* shorter than culm, linear, rough-edged. *Spike* slender, lax-flowered, depauperate. *Scales* ovate, acuminate, 1-nerved, the lowest awned, articulate, deciduous, except the saccate base. *Utricles* elliptical, attenuate both ways, plane or obtuse-angled, glabrous, truncate; their *awn* long-hooked, twice the utricle in length.

S. Patagon., by Cabo Negro and Punta Porpesse; Fuegia, Ushuaia; Cape Horn.

12. U. TRIQUETRA Kükenthal.

Rhizome cespitose. *Culm* 60–70 cm. high, strict, filiform, obsoletely triquetrous, scabrid upwards, base covered by brown sheaths. *Leaves* shorter than the culm, 3 mm. broad, plane, very green. *Spike* 4–6 cm. long, lax-linear, *male* part short, scales oblong, obtuse dorsal nerve green, not reaching the apex; *female* scales longer, blood-red. *Utricles* exceeding

the scales, 7 mm. long, elliptical-trigonal, greenish, obsoletely nervous, with short rostrum. *Achene* oblong. *Awn* glabrous, twice as long as the utricle.

W. Fuegia; Beagle Channel, by Rio Olivaia.

9. CAREX Linn. Sedge.

Grass-like herbs, usually with trigonal culms, sheathed by the closed base of the 3-ranked leaves. Flowers monœcious or diœcious, solitary in the axils of scales, without true perianth, forming spikes which are subtended by the upper leaves, and are wholly male, or wholly female, or with the flowers androgynously mixed in the same spike. Stamens 3, rarely fewer. Style-branches 2 or 3. Achenes trigonal or lenticular, enclosed in a utricle.

Species more than 1,000, cosmopolitan, most abundant in temperate zones, often cespitose and forming tussocks in marshy places.

Carex Analysis, for Species of South America.

(Based on Kükenthal in Engler's Bot. Jahrb. xxvii, 558.) The species reported from Patagonia have their numerical position prefixed.

1. Spike 1, androgynous. 2.
   Spike 1, subglobose, male above, female below, with long bracts. Leaves filiform, half as long as the culm. (28) *C. ortegæ.*
   Spikes numerous. 12.
2. Spike directly terminal. Stigmas 2–3. 3.
   Pseudolateral. Stigmas 3. 6.
3. Stigmas 3. Spikes 5–6-flowered. Utricle terete, subulate. Achene with an exsert seta. (Sub *Uncinia*, p. 271) *C. microglochin fuegiana.*
   Stigmas 2. Utricle plano-convex. 4.
4. Rhizome creeping. Spike few-flowered; scales acute. *C. trichodes.*
   Rhizome deep, sending up many low, angulate-terete, sulcate culms. Diœcious, male spike solitary, female spikes few. Utricle convex-concave with long rostrum. (37) *C. subantarctica.*
   Rhizomes cespitose. Spike many-flowered, obtuse. 5.
5. Scales round, persistent. Utricle broad. *C. capitata.*
   Scales ovate, caducous. *C. caduca.*
6. Spike 1, pseudolateral. Stigmas 3.
   Culm low, leafy. Rostrum long. *C. vallis-pulchræ* Phil.
   Culm taller. Fruit suberostrate. 7.
7. Culm triquetrous, weak. Leaves plane. Utricle winged. *C. sellowiana.*
   Culm subterete, smooth. Leaves not plane, few. Utricle not winged. 8.
8. Culm thick, leafless. 9.
   Culm slender, leafy. 10.

9. Basilar sheaths mediocre. Bract half as long as spike. Female scales obtuse, deciduous. (3) *C. aphylla.*
   Basilar sheaths large, the upper produced. Bracts twice as long as spike. Female scales acute, persistent. *C. molinæ.*
10. Rhizome cespitose. Culms all flowering. Leaves reduced. *C. berteroani.*
    Rhizome bearing also sterile culms. Leaves developed. 11.
11. Culm rigid, exceeding the rigid leaves. Spike globose, many-flowered. *C. andina.*
    Culm slender, nearly hid in sheaths. Spike subglobose, few-flowered. (29) *C. patagonica.*
12 (from 1). Spikes numerous.
    Spikes sexually mixed. 13.
    Spikes sexually distinct. 37.
13. *Hyparrhenæ.* Spikes basally male. 14.
    Acrarrhenæ. Spikes apically male. 16.
14. *Hyparrhenæ.*
    Spikes crowded into a head. Utricle winged, long-rostrate (Uncinia). (26) *C. leporina* L. (*C. macloviana* d'Urv.).
    Spikes 5–6, ovate, contiguous. Utricle plano-convex, margined. Rostrum 2-toothed. (31) *C. propinqua* N. & M.
    Spikes remote. Utricles short-rostrate. 15.
15. Scales white. Spikes small. Utricles not winged. (9) *C. canescens* L. or (36) *similis* d'Urv.
    Scales blackish. Spikes larger. Utricle spinulose-winged. (4) *C. atropicta* Steud.
16. *Acrarrhenæ.*
    Spikes more or less sessile. 17.
    Spikes 4, upper one androgynous, lower female and stalked. Stigmas 2. (25) *C. lechleri.*
    Spikes long-stalked. 31.
17. Spikes remotish, short-petioled, long-bracted. *C. uruguensis.*
    Spikes crowded in a head. 18.
18. Head involucrate. Rostrum incurved. 19.
    Head exinvolucrate. Rostrum straight. 23.
    Head with a long leafy bract: rostrum cleft. (13) *C. divisa* Huds.
19. Sheath cross-wrinkled. Spike long, compound. *C. brongniartii* Kth.
    Sheath smooth. Spike short, simple. 20.
20. Utricles tubercled, nervose, and spongiose. (6) *C. bonariensis* Dsf.
    Utricles smooth. 21.
21. Spike oblong. Utricle nervose, spongiose. (7) *C. bracteosa* Ktze.
    Spike ovate or ovate-oblong, not very nervose. 22.
22. Spike 2 cm., crass. Utricles green-margined. *C. soraira* Kth.
    Spike 1 cm., less crass. Utricles green- or fulvous-margined. (23) *C. involucrata* Bt.
23 (from 18). Head long. Utricle narrow, ciliate-margined. Rostrum long. Culm hid among leaves. *C. reichii* Krk.
    Head ovate or triangular. Utricle broader, not ciliate-margined. 24.
24. Utricle membranaceous, not crass. 25.
    Utricle suberose-incrassate. 26.
25. Culm terete, compressed, incurved. Leaves plicate, not thick. Spike globose, ovate, male flowers generally concealed. Scales broad-ovate, mucronate. (22) *C. incurva* Lightf.

Culm obtusely triquetrous. Leaves subterete, thick. Spike oblong, male part conspicuous. Scales ovate-lanceolate, acute. *C. melanocystis* Desv.

26. Utricles coriaceous, margined, not winged. 27.
Utricles membranaceous. Wings crass at margins. 30.

27. Spikes compound. Rostrum rough, more or less incurved. *C. marcida* Bt.
Utricle dorsally convex. Rostrum straight. 28.

28. Utricle small, 2 mm. high, spongy. Spikes often unisexual. (18) *C. gayana* Dsv.
Utricle longer, thicker. Spike androgynous. 29.

29. Culm rough above. Spikes compound. Utricle not stiped. *C. macrorrhiza* Bt.
Culm smooth; spikes simple. Utricle stiped. *C. hypoleucos* Dsv.

30 (from 26). Culm compressed-trigonal, rough upwards. Utricle 4 mm., ovate, attenuate-stipitate, 2-toothed, with long rostrum. *C. pycnostachya* Dsv.
Culm thick, smooth. Utricle 3 mm., glabrous, ovoid, winged, stiped. (24) *C. kurtziana* Kük.

31. *Spikes long-pediceled.*
(From 16.) Spike of few, simple, rarely compound, spikelets. 32.
Spikes 10–12, upper 4 male, lower ones long-stalked. Stigmas 2. Rostrum 2-toothed. Bracts exceeding culm. (20) *C. incompta.*
Spike paniculate, of many spikelets. 35.

32. Lateral spikelets subbasilar. Utricle pyriform. Stigmas 3. 33.
Lateral spikelets subterminal. Utricles plano-convex. Stigmas 3. 34.

33. Rhizome laxly cespitose. Spike clavate. Scales whitish. *C. phalaroides* Kük.
Rhizome densely cespitose. Spikes scarcely cespitose. Scales pubescent. *C. macella* Kth.

34. Spikes slender, laxiflorous. Utricles elliptical, not as long as the scales. *C. pichichensis* Hum.
Spikes crass, densiflorous. Utricles broad-ovate, equalling the scales. *C. brunnescens* Bck.

35 (from 31). Panicles divaricate. Utricle green, red-spotted. Stigmas 2. *C. seditiosa* Steud.
Panicle contracted. 36.

36. Secondary panicles interrupted. Utricle 3.5 mm., planoconvex. Stigmas 2. *C. catamarcensis* Clk.
Secondary panicles contiguous. Utricles 2.5 mm., trigonal-globose. Stigmas 3. *C. latibracteolata* Kük.

37. *Spikes sexually distinct.*
(From 12.) Terminal spike basally male; laterals only female. Stigmas 3. *C. boliviensis* var. H. & M.
Spikes 3, short, males at base and sometimes at apex, the lower stalked and bracted. Utricle compressed. (16) *C. fuegiana.*
Terminal spikelet typically male; laterals female. 38.

38. Utricles entire or brevirostrate. 39.
Conspicuously rostrate and 2-toothed. 45.

39. Stigmas 2. 40.
Stigmas 3. 43.

40. Leaves narrow-involute. Basal sheaths leafy. Spikes subsessile, single. Scales obtuse. 41.
Sheaths leafless. Leaves broad, plane, revolute. Spikes long-stalked, in 2's and 3's. Scales acutish. 42.

Sheaths leafless. Spicate glomerules. (34) *C. schedonautos.*

41. Bracts shorter than culm. Spikes few, oblong-cylindrical, or short. Utricles subsessile, nerveless. Achene nearly filling the utricle. *C. vulgaris* Fr.

Bracts longer than culm. Spikes many, cylindraceous. Scales soon deciduous. Utricles stiped, nervose. Achenes scarcely filling two thirds the utricle. (12) *C. decidua* Bt.

42. Spikes approximate, only the lower stalked. Scales scarcely elongate. Utricles many-nerved. (2) *C. andersoni* Bt.

Spikes remote, numerous, all stalked. Scales elongate. Utricles granulose-punctate, few-nerved. (11) *C. darwinii* Bt.

43. Culm low, concealed in the leaves. Female spikes oblong, lax. Rostrum short, often recurved. *C. brachycalama* Gris.

Culm medium, leaves as long. Lower spikes nodding. Utricles elliptical. (19) *C. germana.*

Culm exceeding the leaves. Male spike 1, female spikes about 4, little remote. Utricles ovate-oblong. (17) (*indecora*) *C. fuscula.*

Culm tall, free. Spikes distant. Utricles compressed-triquetrous. 44.

44. Culm acute-angled, rough upwards. Female spikes long-stalked, lax, nodding; only 1 terminal male. Utricle glabrous, grayish. (27) *C. magellanica* Lam.

Culm obtuse-angled, smooth. Female spikes short-stalked, erect. Terminal males 4. Utricle straw-purple, striolate, spinulose-margined. *C. hispida* Sch.

45. (From 38.) *Utricles very rostrate, 2-toothed.*

Legs of rostrum directly prostrate. Leaves not septate-nodose. 46.

Legs of rostrum divergent. Leaves septate-nodose. 51.

46. Culm very short, hid among leaves. Female spikes sessile, crowded. Utricle compressed. Stigmas 2. (1) *C. acaulis* d'Urv.

Culm tall (about 1 meter). Root creeping.

Culm acute-angled, smooth. Male spikes 3; female spikes 3, distant, nutant. Utricles compressed. (32) *C. pseudocyperus* L.

Culm acute-angled, rough. Male spikes 3–5; female spikes 3–5, some apically male. Utricle ovate-conical. (33) *C. riparia* Curt.

Culm unknown. Male spikes 2; female spikes 5, some apically male. Bracts very long. (35) *C. serranoi* Phil.

Culm free. Stigmas 3. 47.

47. Scales blackish. Utricles 5–7 mm., compressed. Rostrum slender, purple. Terminal spike sometimes female at apex. (5) *C. banksii* Bt.

Scales rusty. Utricles shorter, subinflated, trigonal. 48.

48. Spike long-cylindrical, dense, more or less pedunculated, often at length nodding. Utricle small. 49.

Spike oval or oblong, subsessile, erect, dense. Utricle larger. 50.

49. Leaves 2, nerved above. Utricle compressed-trigonal, olive-colored, not shining. *C. falcata* Bt.

Leaves 3–4-nerved. Utricle inflated-trigonal, brown-olive, shining, stiped. *C. lamprocarpa* Ph.

50. Scales more or less awned. Utricle greenish-yellow, purple-striolate, with 2 lateral nerves. (21) *C. incouspicua* Steud.

Scales obtusish. Utricle very and equally nervose. *C. flava brevirostrata* Kk.

51. *Rostral lobes divergent.*

(From 45.) Female spikes basilar, long-stalked, few-flowered. Utricle to 18 mm., subulate, long-rostrate. *C. macrosolen* St.

Female spikes many-flowered. Utricle shorter. 52.

52. Utricle hirtellous. 53.
Utricle glabrous. 55.
53. Utricle densely granulate, suberose. *C. tweediana* Nees.
Utricle not granulate. 54.
54. Utricle red-tomentose. Rostrum short, slightly 2-toothed. (15) *C. filiformis* L.
Utricle olive-purplish, setulose. Rostrum long, 2-toothed. *C. beechyana* Bt.
55. Utricle coriaceous, shortly and broadly rostrate; rostrum slightly 2-toothed. 56.
Utricle submembranaceously long-rostrate, and deeply 2-toothed. 59.
56. Culm short. Leaves canaliculate. Bracts sheathing. *C. pumila littorea* Labill.
Culm long. Leaves plane. 57.
57. Spike flexuose. Utricle compressed-trigonal, plumbeous, rusty-striolate. *C. brasiliensis* St. H.
Spikes erect. Utricle turgid-trigonal. 58.
58. Scales lanceolate, awned. Utricle fusiform, olive-brown, sessile. (30) *C. riparia chilensis* Brng.
Scales spatulate, bifid, very long-awned. Utricle pale, obovate-oblong, long-stalked. (39) *C. trifida* Cav.
59. Utricle globose. Rostrum long, its teeth lanceolate. *C. stenolepis* Tor.
Utricle less inflated, costate-nervose; its teeth more or less awned. 60.
60. Spikes erect. Scales black-purple, cuspidate. Utricle stramineous. *C. acutata* Bt.
Spikes ultimately pendulous. Scales whitish-rusty, awned. Utricle pale green. (32) *C. pseudocyperus platygluma* Cl. and *C. pseudocyperus hœnkeana* Pr.

1. C. ACAULIS d'Urv.

Style 2-branched. *Dwarf*, 25 mm. high, with short rhizome. *Culm* enclosed in the sheaths. *Leaves* numerous, rigid, spreading, narrow-acuminate, keeled and denticulate. *Spikes* 4–5 mm. long, crowded, dense-flowered; male solitary, orbicular-ovate, 10-flowered; females 4, orbicular, 8-flowered, short-pedunculate. *Scales* yellow-rusty, pale-margined, oblong-acute, crowded. *Utricles* slightly larger, ovate-compressed; *rostrum* 2-toothed.

Falklands (the only specimen known).

(*C. æmatorhyncha* Desv. = *C. filiformis* L.)

2. C. ANDERSONI Boott.

Style 2-branched. *Stout*, 40 cm. high, the base covered by sheaths. *Spikes* 7–9, black-purple, erect, the uppermost male, the others female, oblong to cylindrical, above in twos or threes, sessile; lower ones pedun-

cled; occasionally all are apically male. *Utricle* elliptical, short-rostrate, the mouth entire, shorter than the dark, pale-nerved *scale*.

Magellan.

3. C. APHYLLA Kunth.

Spike solitary, dicœcious; *style* trifid. *Culms* cespitose, terete, rigid, glabrous, sheathed at the base, leafless. *Female* spike obliquely inserted, subtended by a spathe-like, ovate-oblong bract. *Utricles* oblong, compressed, apically narrowed, and acutely bidentate, with ciliolate angles. *Stigmas* very long. *Scales* ovate, rounded apically, convex, 3-nerved, hyaline, whitish, dorsally green, pale ferruginous at apex and margin, glabrous, deciduous. Male spike unknown.

S. Patagon., in moist hills near Rio Carren-leofú.

4. C. ATROPICTA Steud.

Style 2-branched. *Root* woody, stoloniferous. *Culm* 15–45 cm. high, smooth, leafy at base. *Leaves* plane, linear, acute, smooth or with rough edges, much shorter than the culm. *Spikes* androgynous, males at base, most of them peduncled, subternate, approximate, subovate; the *scales* oblong, obtuse, brown. *Utricles* dark-purple, apically whitish, bifid, rostellate.

(Argentina); S. Patagon. (Nordensk.); Magellan; E. and S. Fuegia (Dusén).

FIG. 49.

Carex banksii. Inflorescence; and (on left) male flower; (on right) female flower and achene. (From *Flora antarctica*.)

5. C. BANKSII Boott.

Style 3-branched. Culm 45 cm. tall, leafy at base, glabrous. *Leaves* 4–6 mm. broad, not as long as culm, rough on edges and nerve. *Spikes* 3–5, black-purple, oblong, basi-cuneate, thick, exsert, nodding; the uppermost one androgynous, the others female; the lowest remote. *Utricle* hyaline, whitish, compressed, broad-ovate, ros-

trate, its mouth oblique, bifid; shorterand broader than the dark, spatulate, emarginate, awned *scale*. (Fig. 49.)

S. Patagon., near Carren-leofú; Magellan; Fuegia.

6. C. BONARIENSIS Desf.

Style 2-branched. *Culms* cespitose. *Leaves* linear, subcarinate, rough-edged near their apex, nearly equalling the culm. *Spikes* androgynous, male at top, crowded into a spicate thyrse, 20 mm. long, with 1–2 involucrate leaves. *Bracts* within the thyrse smaller. *Utricle* spreading, broad-ovate, convex-concave, ending in a 2-toothed *rostrum*.

(Argentina); Falklands.

7. C. BRACTEOSA Kuntz.

Style 2-branched. *Culm* 12–30 cm. high, trigonal, glabrous. *Leaves* as long, plane. *Panicle* spike-like, ovate, obtuse, dense, involucrate by 2 leafly bracts. *Spikes* short, androgynous, male at apex. *Utricle* 5 mm. long, ovate, attenuate both ways, internally 4-, externally 5-nerved, spongy at base; *rostrum* smooth, rather long, 2-toothed.

(Paraguay); Chiloë; Patagonia.

8. C. CAMPYLOXYS Steud.

Style 2-cleft. Rhizome woody. *Culm* 35 cm. high, firm, smooth, leafy; *leaves* as long, upper ones bracteate. *Spikes* 4, 1 terminal, male, linear; 3 female, oblong-linear, subsessile. *Scales* oblong-linear, acuminate.

Magellan.

9. C. CANESCENS Linn.

Style bifid. *Root* fibrous, cespitose or stoloniferous. *Culm* 30 cm. high, erect, trigonal, rough. *Leaves* plane, linear, 2 mm. broad, rough-edged, acuminate, equalling the culm. *Spikes* about 6, androgynous, male at base. *Utricle* ovate, plano-convex, exceeding the broad ovate acute scales. (See *C. similis*.)

(Temperate Eurasia and N. Amer.); S. Patagon., by Rio Sta. Cruz, and Gregory Bay.

C. CANESCENS ALPICOLA Wahlenb.

Usually smaller and slender. *Spikes* smaller, acutish, in fruit subrotund and fuscescent.

(Eur.; Greenland; Alaska); Magellan; Fuegia; Falklands.

C. CANESCENS CURTA Good.

Leaves shorter than the slender, stiff *culm*. *Utricle* under 2 mm. long, beaked, equalling the scales. (Is probably *C. similis* d'Urv.)

(Eur.; N. Amer.); Magellan; Falklands.

C. CANESCENS ROBUSTA Blytt.

Magellan; E. and S. Fuegia. (Dusén.)

10. C. CAPITATA Linn.

Styles bifid. *Root* cespitose, fibrous, creeping. *Culm* 12 cm. high, slender, smooth, trigonal. *Leaves* shorter, subfiliform, rigid. *Spike* subglobose. Utricles ovate-acuminate, glabrous, compressed, longer than the round-ovate scale. *Rostrum* whitish.

11. C. DARWINII Boott.

Style 2-cleft. *Culm* stout, tall, glabrous, leafy at base. *Leaves* 6–8 mm. broad, serrate-scabrous on edge and keel. Bracts leafy, exceeding the culm. *Spikes* 8–12, ferruginous, cylindrical, peduncled, nodding; the upper 2 male; the others female, in 2's and 3's. *Utricle* elliptical, *rostrum* short, mouth entire, broader than the lanceolate-acuminate scale. (Fig. 50.)

Chonos Archip.; Patagon.; Magellan.; N. and W. Fuegia. (Dusén.)

FIG. 50.

Carex darwinii, showing spike and female flower. (From *Flora antarctica*.)

12. C. DECIDUA Boott.

Style 2-cleft. *Culm* 30 cm. high. *Leaves* longer, 2–3 mm. broad, glabrous except the edges. *Spikes* 4–7, black-purple, erect; the uppermost androgynous, males at base, or also at top; the others female. Upper spikes sessile, contiguous, oblong; lower cylindrical; lowest short-peduncled, remote. *Utricle* oblong-ovate, rostellate, its mouth entire; exceeding the oblong dark scale.

(Califor.); Magellan.; Fuegia; Falklands.

C. DECIDUA MINOR Kükenth.

Patagon.; E. Fuegia. (Dusén.)

13. C. DIVISA Huds.

Styles bifid. *Rhizome* thick, creeping. *Culm* erect, obtusely triquetrous, rough upwards, 30 cm. high and more. *Leaves* narrow, of varying length, rough on edges and keel. *Spikes* crowded irregularly in an ovate head, androgynous, males at apex; an erect leafy bract at the base of the head, usually long, and acutely triquetrous. *Fruits* roundish-ovate, convex on one side, subconcave on the other. *Beak* acutely bifid with finely serrate edges. Scales ovate-elliptical, mucronate, fuscous, exceeding the utricle.

(Europe); Patagonia.

14. C. FESTIVA Dewey. (*C. inciso-dentata* Steud.)

Style 2-cleft. *Panicle* spike-like, of several androgynous, basi-masculine *spikes*, in an ovate-orbiculate head. *Utricle* ovate, acuminate, rostrate, bifid, obliquely cleft, as long as the lanceolate acute *scale*.

(N. of Eurasia and of N. Am.); Patagonia; Magellan, in damp woods; Fuegia.

15. C. FILIFORMIS Linn. (*C aëmatorhyncha* Desv.)

Stigmas 3. *Culm* slender, 60–90 cm. tall, triquetrous, scabrid above. *Leaves* narrow, with scabrid margins. *Bracts* leafy, sheathless, exceeding the culm. *Spikes* 5–6, erect, the males 2–3 above, approximate, the females 3, distant, dense, cylindric, the lowest short-peduncled. *Scales* ovate-acuminate, subulate-awned, sanguineous, 1-nerved, with the keel green. *Utricle* ovate, 4 mm. long, obsoletely nervose, rufescent, hispid, attenuate to a short obliquely truncate, ciliolate *rostrum*.

(Chili); S. Patagon., by Rio Sta. Cruz and Gregory Bay; and Carren-leofú; Fuegia.

(*C. fuscula* d'Urv. = *C. indecora* Kth.)

16. C. FUEGIANA Phil.

Styles 2-cleft. *Culm* 50–60 cm. high, slender, sometimes scabrid at top. *Leaves* half as high, strict, narrow, rough on edge and midrib. *Spikes* 3, short, contiguous, male at base and sometimes at apex, upper one larger, lower pedicelled and bracted; its bract subulate, scarcely half as long as the spike. Male scales dark-purple, the nerve white; female scales smaller, narrower than the utricle. *Utricle* compressed, its

base attenuate, white, ultimately purplish; its margins yellowish, fimbriate; *rostrum* short.

E. Fuegia. (Compare *C. atropicta* Steud.)

17. C. FUSCULA d'Urv. (1825). (*C. indecora* Kth., *C. inconspicua fuscula.*)

Style 3-cleft. *Culms* triangular, glabrous. *Leaves* shorter than the culms, narrowly grass-like, plane, rigid, edge scabrid. *Male spike* solitary; *female spikes* about in 4's, little remote, cylindraceous-oblong. *Utricles* ovate-oblong, attenuate-rostrate, nerveless, rusty, glabrous, angles scabrid upwards. *Scale* round-elliptical, mucronate. *Rostrum* truncate, cleft *behind.*

Differs from *C. involucrata* Boott by bracts long, mucronate-awned, utricles green and minutely and densely fuscous-punctulate. (Speg.)

S. Patagon., by Gregory Bay and Rio Sta. Cruz; Falklands; Fuegia. N. and E. Fuegia. (Dusén.)

18. C. GAYANA Desv. (*C. divisa* Huds.)

Style 3-cleft. *Root* creeping, strongly fibrous. Culm 30–60 cm. tall, erect, trigonal, smooth, striate. *Leaves* plane, linear, acuminate, rough-edged upwards, shorter than culm. *Male spike* solitary, cylindraceous; *female spikes* 3, short-pedunculate, few-(5–10)flowered; bracts sheathing. *Utricles* ovate, obtusely trigonal, longer than the ovate-obtuse brownish scale. Rostrum short.

(Eur.; W. Asia; New Mex.; Chili.)

C. GAYANA DENSA Kükenth.

S. Patagon. (Nordensk.); N. Fuegia (Dusén).

19. C. GERMANA Boott.

Style 3-cleft. *Culm* 35 cm. high, obtuse-angled, glabrous, 2–3-leaved. *Leaves* sheathing, as long as the culm, triquetrous-acuminate, the keel and edges scabrid. *Bracts* sheathing, the upper setaceous. *Spikes* 4–6, fuscous, rusty; one or two terminal male; the others female, thick-cylindrical, dense-flowered; the upper sessile, erect; the lower stalked, nodding. *Utricles* elliptic, whitish, equalling the awned oblong scale.

W. Patagon.; Cape Tres Montes.

20. C. INCOMPTA Franchet.

Style 2-cleft. *Culm* tall, over 60 cm., slender, smooth. *Leaves* long, rather soft, margin rough, the upper not sheathing. *Bracts* exceeding the culm. *Spikes* 10–12; the upper 4–5 male or androgynous, sessile except the first; the others female, often in 2's or 3's, long-peduncled. Scales fuscous, ovate-lanceolate, as long as the utricle but narrower. *Rostrum* 2-toothed. (Fig. 51.)

Magellan, close to the sea.

FIG. 51.

Carex incompta. Male and female spikes. (After Franchet.)

21. C. INCONSPICUA Steud.

Style 3-cleft. *Root* fibrous, yellow-rufous, cespitose. *Culm* 10–20 cm. high, erect, trigonal, smooth. *Leaves* plane, erect, as long as the culm, rough-edged. *Male spike* 1, rising from the base of the uppermost female spike; *female spikes* 3–4, oblong-ovate (12 mm. long), with longer bracts, all sessile. *Utricle* ovate, *rostrum* short, 2-cleft; scales longer, ovate, red-brown, awned. (See *C. fuscula*.)

(Chili.)

22. C. INCURVA Lightf.

Style 2-cleft. Rhizome long or creeping. *Culm* to 10 cm. high, strong, filiform-terete or compressed, trigonal upwards. *Leaves* approximate, subflexuous, narrow-linear, shorter than the culm, narrowing and keeled upwards. *Spike* capituliform, naked, aggregate of short spikes, 8–15 mm. long, ovate, basitruncate. *Scales* yellow-brown, margins hyaline, the bracteal scales mucronate. *Utricle* longer, *rostrum* acuminate, mouth cleft.

(Orient; Eur.; Greenland); E. Fuegia (Dusén).

Var. HUMILIS.

Cespitose. Falklands.

23. C. INVOLUCRATA Boott.

Style 2-cleft. *Root* cespitose, creeping. *Culm* 60 cm. tall, obtusely trigonal, sulcate, leafy at base. *Leaves* erect, half as long as the culm; 3 mm. broad, plane, acuminate, edge spinulose. *Spike* ovate, obtuse,

continuous, dense, 25 mm. long, androgynous, male at the top; with two leafy reflexed bracts. *Female scales* broad, acute, keeled, mucronulate. *Utricle* longer than the scale, plano-convex, with long 2-toothed *rostrum*. Achene lenticular-oval.

(Brazil); N. Patagon.

24. C. KURTZIANA Kükenth.

Spikelets numerous, sexually mixed, apically male, subsessile, crowded in an ovate-triangular *head*. *Utricle* 3 mm. broad, membranaceous, glabrous, ovoid, winged, subversely thick, stiped. *Culm* thick and smooth.

S. Patagon.; in moist hills by Carren-leofú. Very variable.

25. C. LECHLERI Phil. (non Steud.).

Style 2-cleft. *Culm* 30 cm. high, trigonal, naked above. Leaves much shorter. *Spikes* 4, approximate, ovate, erect; the uppermost one androgynous, apically male; the others female, 7 mm. long; the lowest peduncled. *Bract* scarcely sheathing, not as long as the spike. *Scales* ovate, acute, castaneous, their midnerve green. *Utricle* compressed, obovate-oblong, spinulose-ciliate, rostrum short.

Magellan.

26. C. LEPORINA Linn. (*C. macloviana* d'Urv., *C. ovalis* Good.)

Style 2-branched. Culms 30–45 cm. tall, slender, erect, rough above. Leaves shorter, 2 mm. broad, flat. *Bracts* very short, scale-like or none. *Spikes* 4–7, oblong, male at base, 10 by 6 mm., clustered in a terminal oblong head. *Utricle* ovate-lanceolate, wing-margined; its rostrum tapering, long. *Scales* lanceolate, acute, brown, shorter than the utricles.

(Eurasia; N. Amer.; Chili); S. Patagon., by RR. Gallegos and Sta. Cruz; Falklands.

FIG. 52.

Carex magellanica. Spike, female flower and achene. (From *Flora antarctica*.)

27. C. MAGELLANICA Lamk.

Style 3-branched. *Root* from woody fibers. *Culm* 20 cm. high, slender, filiform upwards, rough. *Spikes* 3–4, androgynous, male at their base, dark-purple, oblong, peduncled, nodding, bracteate, or the lowest sheathed. *Utricles* suborbicular, stipitate, mouth of rostrum entire; half as long as the long scale. (Fig. 52.)

(Iceland ; Arctic regions ; W. Amer. ; Chili) ; S. Patagon., near Carren-leofú ; Magell. ; S. Fuegia.

(*C. microglochin* sub *Uncinia.*)

28. C. ORTEGÆ Phil.

Culm 22 cm. high, smooth, not cespitose. *Leaves* scarcely half as long, filiform, smooth. *Bract* terminal, 6 times as long as the apparently lateral spike ; *spike* subglobose, male above, female below. *Female* scales ovate, castaneous, with a long leafy cusp. *Utricles* oblong, narrowing both ways ; rostrum bifid, with erect teeth. *Achene* orbicular, compressed, black.

Fuegia (along with *C. fuegiana*).

29. C. PATAGONICA Speg. (Plate XII.)

Androgynous, acraudrous, monostachyous, 3-styled, glabrous, densely cespitose. *Leaves* fasciculate, long, and finely filiform, erect. *Spikes* few-flowered, concealed amid the bases of the leaves, bracteolate, subglobose, pseudolateral, the bracts ovate-triangular, acute. *Utricle* finely obovate, glabrous, 3 by 1 mm., with 3 divaricate stigmas. *Achenes* obovate, smooth, dorsally convex, ventrally plane, rufescent, sometimes trigonous, depending on immaturity. *Culms* from the center of the leaf-fascicles, but scarcely rising above the leaf-sheaths, 5–15 mm. high by 0.3 mm. thick, glabrous. Leaves and bracts narrow-linear, green, acute, dorsally nervose, produced straight.

Patagon., in drains by Rio Chubut (Speg.) ; by Rio Sta. Cruz (Hatcher.)

30. C. PEDICELLATA Phil.

Style 2-branched. *Culm* 20 cm. high, sheathed at base by dead leaves. *Leaves* as long, flat, smooth, 4 mm. broad, the penultimate culm-leaf much exceeding the crowded, erect short *spikes.* Uppermost spike male, three lower female. *Scales* oblong, obtuse, mid yellow, margin dark. *Utricle* green, white at base, stalked, inflated.

W. Patagon. ; Valley of Rio Pequena.

31. C. PROPINQUA Nees & Mey.

Style 2-cleft. *Root* creeping. *Leaves* shorter than the culm, recurved, trigonal, acuminate, scabrid. Compound *spike* short, ovate, dense,

having 5–6 ovate spikes, which are male at the base. *Utricles* plano-convex, ovate, with sharp denticulate angles. *Scales* shorter, ovate-oblong; *rostrum* acute, 2-toothed.

(Equat. Andes; Chili; Argent.); Patagon., Rio Sta. Cruz; Magellan; S. Fuegia.

32. C. PSEUDOCYPERUS Linn.

Tristylous. Terminal *male spike* solitary, and 3–6 dense cylindrical *female* spikes drooping on long pedicels. *Culms* 60–90 cm. high, acute-angled, glabrous, rough on the angles, at least above. Leaves nodulose, 5–10 mm. broad. *Bracts* leafy; the lowermost sometimes sheathing the others without sheaths. *Scales* setaceous, scabrous.

Fruit oblong, very acuminate, ribbed. *Rostrum* bifid.

(Old World.) Patagonia; common in swamps near Rio Chubut; by Lago Nahuel-huapi.

33. C. RIPARIA Curtis.

Style 3-cleft. *Root* thick, creeping. *Culm* about 1 meter tall, acutely trigonal, rough-edged. *Leaves* plane, broad, rough-edged, acuminate. *Bracts* leafy, exceeding the culm, their sheaths short. *Male* spikes 3–5, at top; about as many *female spikes* below, cylindrical, sometimes male apically. *Utricle* ovate, tapering to a short 2-toothed *rostrum*. *Scale* shorter, ovate-oblong, awned.

(Eur. and N. Am. Brit. & Br. i, 303); "common along water courses in N. Patagon. to Buenos Ayres" (J. Ball). The form *incrassata*, has very long leaves, male spikes, a large terminal surrounded by small ones; the scale having 7 confluent whitish nerves with interposed furrows on the lower surface.

C. RIPARIA CHILENSIS Brongn.

Leaves very long, linear. *Male spike* solitary; *female spikes* ovate-oblong. *Scales* lanceolate-subulate, longer than their utricles.

N. Patagon., mouth of Rio Chubut. (Dusén.)

34. C. SCHEDONAUTOS Steud.

Style 2-cleft. *Culm* to 60 cm. tall, erect, trigonal, glabrous, with loose leafless sheaths below, leafy above. Culm *leaves* plane, narrow-lanceolate, rough-edged, with setaceous apex; sometimes exceeding the culm. *Spike-like* crowd of alternate glomerules, 25 mm. long; male and andro-

gynous intermingled. *Scales* ovate, with excurrent midnerve, the lower broad-lacerous, longer than the short glabrous *utricle* with 2-cleft rostrum. *Achene* trigonal, smooth.

Magellan, Oazy Bay.

35. C. SERRANOI Phil.

Styles 3. Culm? Leaves? *Bracts* very long, not sheathing, the lowest 5 mm. broad. *Spikes* approximate, all but the lowest erect; 2 male, 5 female, the upper ones male at their apex. *Male* scales lanceolate, their center white; *female* scales longer and twice as broad. *Utricles* firm, ovate-elliptical, acute both ways, compressed, margined, ventrally flat and 2-nerved, dorsally 5-nerved, convex. *Achene* red, ovate, acute, compressed.

High up in W. Patagon. at 700 meters, partly snow-covered.

36. C. SIMILIS d'Urv. (1825). (*C. curta* Good.)

Culm triquetrous, strict, slightly scabrous. *Leaves* plane, linear, subcarinate, apex subulate. *Spikes* 6–rarely 8, androgynous, the lower part male, sessile, alternate, elliptical; upper ones approximate. *Scales* ovate, acutish, squarrose, with 1 green nerve. *Fruits* ovate-lanceolate, scarcely bidentate. Perennial. "Is decidedly the European *C. curta*" (Stendel); a synonym of *C. canescens* L. (Index Kewensis).

Fuegia, Basket Isle, Amakouáia, rare; Falklands.

37. C. SUBANTARCTICA Speg.

Diœcious, distylous. *Culms* low, angulate-terete, very sulcate, smooth; leaves as long or shorter, slightly coriaceous, very carinate, rather flat, glaucescent-green, narrowing upwards to a blunt triquetrous point. Cylindraceous-fusoid *male spike* solitary, acrogenous, bractless, its scales spatulate, obtuse, the lower subretuse, the upper rounded, often mucronate, with a hyaline margin, subcarinately green. Stamens long-exsert. *Female spikes* few; the primary one exsert, acrogenous on the culm, the secondaries smaller at base of the culm, and almost concealed in the leaves; their scales more acute and pale than in the males; *utricles subelliptical*, subsessile, dorsally convex-concave, scarcely nervose, glabrous, abruptly ending in a long truncate toothless rostrum. *Achene* plumbeous, punctulate, lenticular.

S. Patagon., in hills along Carren-leofú, and by Rio Sta. Cruz.

Rhizome deep, often sending up numerous branches; each culm bearing about 20 leaves, about 3–9 cm. long.

38. C. TRICHODES Steud.

Stigmas 2, exsert. *Culms* many, erect, 10–15 cm. high, capillary-setaceous, compressed-triangular, few-leaved above the base. *Leaves* flexuose, setaceous, slightly longer than the culm, obtuse, serrulate. *Spikes* ellipsoid, 4 by 3 mm., becoming subglobular, few-flowered. *Scales* 3-nerved, keel green, sides brown; the upper acuminate-mucronate, the 3–2 lowest leafy, cusped. *Utricles* exceeding the scale, compressed, biconvex, their rostrum scabrid, their mouth 2-toothed.

(Chili); S. Fuegia, about Ushuaia.

39. C. TRIFIDA Cav.

Style 3-cleft. *Culm* 60–90 cm. tall, robust, trigonal, erect, its apex smooth. *Spikes* 6–8, erect, approximate, cylindric-ventricose; the 3 uppermost male, sessile; the others female; the lowest stalked. The lowest *bract* leafy, scabrid, exceeding the culm. *Scales* linear, brown-rusty, their keel white, 3-nerved, irregularly emarginate. *Utricles* obovate, abruptly terminated by a cylindrical 2-cusped *rostrum*, with a white *awn*; attenuate at base.

(New Zeal.; Antipodes; Auckland and Chatham Is.); Magellan. Cape Tres Montes; Falklands; Fuegia (Hariot).

"A noble species, growing with and emulating the young tussock-grass." That found in Fuegia has the awn on the scale short, and the scale itself not bilobed.

C. TRIFIDA FRANCHETII Kurtz.

Differs from the typical species by having the *spikes* once or twice smaller, the *awns* much smaller; the *utricle* membranaceous, whitish, more or less purple-marked; uppermost spike often apically female.

Fuegia, subalpine by Rio Grande on Beagle Channel.

40. C. UROLEPIS Franchet.

Style 2-cleft. *Culm* a meter or more high, robust, trigonal, two sides concave, the angles scabrid. *Leaves* very long, to 10 mm. broad, rough-

edged, upper ones auricled but not sheathing. *Spikes* 10–15, the 2–4 uppermost male; the lower androgynous or female except their apex; often with pairs pendulous; the lower peduncled. *Scales* fuscous, white dorsally, ovate-lanceolate, their point recurved, scabrid. *Utricles* ovate, 3–5-nerved; *rostrum* conspicuous, 2-toothed. Lowest spike 8–9 cm. long, becoming 1 cm. thick. (Fig. 53.)

(Near *C. darwinii* Boott, but more robust and rigid. Points of the scales much prolonged, and utricles proportionately longer.)

S. Patagon., Otway L., Puerto Bono, Port Eden.

FIG. 53.

Carex urolepis. Spike, male flower, and utricle. (After Franchet.)

41. C. VULGARIS Fries.

Digynous. Terminal *spikelets*, 1–2, male; the others, 3–4, female. *Rostrum* toothless. *Leaves* slender, their sheaths not filamentous. *Culm* erect, trigonal, obtuse-angled, 30 cm. or more high. Lower *spike* shortly stalked; lower bract leafy, with short, round, dark auricles. *Scales* elliptic to ovate-obtuse. *Utricle* plano-convex, elliptic, or obtuse, with filiform nerves upwards. *Rostrum* toothless.

(Old World); Patagon., in watery places by Rio Chubut and Carrenleofú.

Family 12. ARACEÆ.

Mostly herbs, with simple or compound usually basal *leaves*, often veiny, and monœcious, or sometimes diœcious or hermaphrodite *flowers* on a simple *spadix*, usually surrounded by a *spathe*, and usually *without perianth*. *Fruit* often a berry, with erect, orthotropous *embryo*.

Species 900, most tropical; some in temperate regions, (in Australia, not reported from New Zeal.).

PISTIA Linn.

Floating, stemless, pubescent, stoloniferous, with fibrous roots. *Leaves* rosulate, sessile, obovate-cuneate, with fan-like nerves. *Spathe* small, white, plicate on both sides, half embracing the base of the ovary, with an open cucullate limb. *Spadix* not appendaged, with a solitary apical,

2-staminate *male flower* and a solitary *female flower* at its base, dorsally adnate to the spathe.

Only species:

P. STRATIOTES Linn.

In tropical fresh-water ponds and streams. From Texas by W. Indies and Central Amer. to Argentina and Patagonia. (Not in Australia or the Pacific Is.)

(Fig. in Eng. & Prantl, ii, 3, p. 153.)

Family 13. LEMNACEÆ. Duckweed.

Minute floating plants without differentiation of leaf and stem, consisting, in the active stage, of a loosely cellular *frond*, with or without roots, and extending by lateral branching, the new fronds soon separating. Reproduction by minute *unisexual flowers* immersed, mostly with a delicate *spathe* in the brood-pouch. *Male flowers* 1–2, having 1 stamen; *female flower* 1, with 1 carpel and 1–few seeds, having endosperm.

Species 28, widely distributed.

A. Frond with roots and 2 reproductive pouches.
  b. Roots usually more than 1, fascicled. Anthers dehiscing longitudinally. *Spirodela.*
  b2. Root solitary. Anthers dehiscing transversely. *Lemna.*
A2. Frond rootless and nerveless, with 1 reproductive pouch.
  b. Frond thick, subglobular. *Wolffia.*
  b2. Frond thin, elongated. *Wolffiella.*

1. SPIRODELA Schleiden.

Stipe fixed peltately under the frond; *roots* more than 1. Reproductive pouches 2, as cleft openings at base of the frond; *spathes* sac-like. *Anthers* 2-celled, with longitudinal dehiscence. Ovules 2, rarely 1.

S. PUNCTATA (Meyer sub *Lemna*) Thompson.

Frond solitary to 2–4, cohering in a chain, elliptical to reniform, averaging 2.5 by 1.4 mm., obscurely 3-nerved, convex above, punctate with brown pigment-cells. *Spathes* with flowers protruding; 2 staminate and 1 pistillate flowers on the spadix. *Filaments* long; *fruits* short, broad, with wings. Seed 1.

Orange Harbor, near Cape Horn, collected by the Wilkes Exploring Expedition, 1839, and forwarded by the courtesy of Professor B. L. Rob-

inson, of the Gray Herbarium, for identification by Professor C. H. Thompson, Missouri Botanic Garden. (See also Thompson in Report of Missouri Bot. Gard. 1897.) It occurs also in British Guiana.

2. LEMNA Linn. Duckweed.

Frond disk-shaped, with a central nerve, and sometimes also with 2–4 lateral nerves; with one rootlet usually ending in a blunt rootcap. *Fruit* ovoid, ribbed.

Species 7, in temp. and trop. regions. (Fig. in Brit. & Br. i, 366.) Hatcher informs us that "Duckweed is abundant in the waters" of S. Patagonia.

1. L. GIBBA Linn.

Frond unsymmetrical, minute, thickish or gibbous underneath, 3–5-nerved. *Ovules* 2–6, anatropous; *seeds* deeply and unequally ribbed.

Cosmopolitan; in quiet waters of Chili; probably also in Patagon.

2. L. MINOR Linn.

Frond thickish, obovate or orbicular, sometimes purplish, with 3–5 lateral nerves. *Ovule* 1, orthotropous; *seed* 12–15-ribbed.

Distribution as the preceding; in pools near Rio Chubut.

3. L. VALDIVIANA Phil.

Frond oblong-elliptical, thin, short-stalked, nerveless. *Seed* 20-ribbed.

(N. and S. Amer., Chili); Argentina.

3. WOLFFIELLA Hegelmaier.

(C. H. Thompson in Missouri Bot. Gard., 9th Annual Report, 1897.)

Wolffia and *Wolffiella* agree in being rootless, nerveless, leafless, with a terminal reproductive pouch, from which arise sessile branches which soon become separate fronds. The *fronds* of *Wolffia* proper are subglobular; those of *Wolffiella* are elongated, very thin and punctate, with brown pigment-cells. *Flowers* and *fruit* of *Wolffiella* are unknown.

Species 4, warm parts of Amer.

W. GLADIATA Hglm.

Frond about 6 times as long as broad, widest at the deeply excavated reproductive pouch. (Fig. in Eng. & Prantl, ii, 3, p. 154, *K*.)

(Mexico; Argentina); probably in N. Patagon.

Family 14. Restionaceæ.

Perennial, cespitose or rhizomatous herbs with cyperaceous or reduced *herbage* and mostly diœcious *flowers* in *spikelets* like Cyperaceæ, but with juncaceous perianth. *Female spikelets* occasionally having only 1 flower. *Stamens* mostly 3, and represented by staminodes in the female flowers. *Anthers* often 1-celled. *Ovary* 1–3-celled; cells 1-seeded; *seeds* orthotropous, with small *embryo* and large endosperm.

Species 230, most in S. W. Africa and Austral.; few in N. Zeal.; fewer in the Orient; and 1 in Chili, etc.

LEPTOCARPUS R. Br. (*Schœnodon* Labill. p. p.)

Rhizome creeping. *Leaf-sheaths* not deciduous. *Diœcious* (rarely monœcious), 3-merous, rarely 2-merous. *Ovary* 1-celled, 1-seeded. *Fruit* dehiscing on the angles, or indehiscent. *Spikelets* many-flowered; the female rarely 1-flowered. *Scales* imbricating.

Species 21, in S. Afr. and Austr. and stragglers in the Orient, N. Zeal. and S. Amer.

L. chilensis Gay (Steud. sub *Calopsis*).

Root fibrous, cespitiferous, subsarmentose. *Culms* erect, strict, simple, nearly 1 meter high, glabrous; the sheaths leafless, in pairs mutually embracing, obtuse, mucronulate, at length cleft, fuscescent. Apical *spikes* numerous, the lower remote, smaller or none; *spikelets* bracteolate. *Bracts* oblong-ovate, mostly bifid, somewhat rusty. *Sepals* of female flowers narrow, the outer obovate, mucronate. *Stigmas* 3; *ovary* triquetrous.

(Chili); W. Patagon.

Family 15. Centrolepidaceæ.

Small moss-like or grass-like herbs, with perfect or polygamous sessile, hypogynous *flowers* in glumaceous spikelets; without *perianth; stamens* 1–2, with 1 versatile anther. *Ovary* 1–3-locular, each locule with 1 pendulous orthotropous *ovule*. *Seeds* with subfarinaceous endosperm.

Species 30, in southern Australia; with stragglers in the Orient, Tasmania, N. Zeal., Auckland I., and Antarctic America.

GAIMARDIA Gaudich.

Moss-like perennials, with 2-merous *flowers*, in 2-flowered *spikelets*, on a terminal peduncle. *Leaves* imbricate, distichous on branching stems.

G. AUSTRALIS Gaud. (Figs: *G–J* in Eng. & Prantl, ii, 4, p. 12.)

Leaves subulate-triquetrous, sheathing at base.

Falklands; Fuegia. W. Magellan, forming peat. (*G. setacea* Hook. f. in New Zeal.)

G. PUSILLA Gaud.

Small, moss-like. *Stem* erect, subfastigiate, branching above, densely leafy. *Leaves* imbricate, subulate-triquetrous, sheathing at base. *Branches* sparse, leafy, ending in a solitary, 1-flowered *spikelet*.

Fuegia; turf-mosses, especially on the mountains.

Family 16. BROMELIACEÆ. Pine-apple.

Epiphytic herbs (or some tropical, terrestrial plants), with mostly scurfy, narrow, sheathing *leaves*, trimerous, regular flowers with double *perianths*, the inner petaloid, and 6 stamens. *Ovary* inferior or superior, 3-locular; *style* 1; *stigmas* 3. *Seeds* numerous.

Species 900, in warm countries.

1. TILLANDSIA Linn. Hanging-moss.

Epiphytes with narrow, entire *leaves*, perianth-leaves free or nearly so; *stamens*, all or three of them hypogynous. *Capsule* septicidal.

Species 350, American.

1. T. ANDICOLA Gill.

Leafy *stem* to 7 cm. long, flexuous, with about 20 sheathing, distichous *leaves*, which are coriaceous, subterete from a lanceolate, clasping base; 2–5 cm. by 1.5 mm.; leaves and 1-flowered peduncles covered by fine scales. *Sepals* naked, lanceolate, ribbed.

(Andes of Mendoza.) May be in N. Patagon.

2. T. COARCTATA (Gill.) Mez. (*T. bryoides* Gris. p. p.)

Dwarf, like club-moss; stem 5–7 cm. long, cespitose, densely leafy. *Leaves* 8–12 mm., short, flexuose, erect, imbricate, linear-acuminate, scurfy. *Peduncle* 1-flowered. *Stamens* deeply included within the minute petals,

the *flower* partly concealed by the uppermost leaves, supported by a 1-nerved bractlet. *Bracts* lanceolate, shorter than the sepals. *Sepals* united at base. Limb of *petals* minute, shortly exceeding the calyx. *Capsule* 3 times as long.

(Argentina); epiphytic or on rocks.

T. COARCTATA PEDICELLATA.

Scape more or less manifest, tall and naked.

(Solinia; Argentina); N. Patagonia.

T. MYOSURA Gris.

Stems thickish, divided from a woody base, leafy; to 15 cm. tall. *Leaves* with dilated sheaths, rather remote, distichous, linear, attenuate, canaliculate-convolute, acuminate, tip recurved, scaly above the middle. *Peduncles* axillary or terminal, as long as the stems, exsert. Inflorescence 1–5-flowered, distichous. *Bractlets* longer than the 3-leaved calyx, exceeding the internodes, *sepals* not united, *petal-claws* as long as the calyx; lamina deltoid, violet when dry, one fourth as long. *Stamens* deeply included, slightly exceeding the style.

(Bolivia, near Mendoza); at Lago Narraco, Patagonia.

3. T. RETORTA Gris. (*T. nappii darwinii* L. & N.)

Stems short, densely cespitose, leafy, branching above, 7 cm. tall. *Leaves* with dilated sheath, rather remote, distichous, linear-acuminate, convolute, recurved and apex incurved, lepidote-scaly. *Peduncles* naked, axillary, equalling the leaf, 1-flowered, rarely 2-flowered. *Calyx* 3-leaved, nearly as long as the bracteole, 2–3 times shorter than the capsule. *Petals* minute; *stamens* deeply included, slightly exceeding the style.

(Argentina; Bolivia); N. Patagon.

(Mez. resolves *T. bryoides* Gris. into 2 species, one *T. coarctata* Gill., the other *T. polytrichoides* Mez. found in Brazil and Argentina.)

2. FASCICULARIA Mez.

Flowers hermaphrodite. *Sepals* free, carinate, lepidote-tomentose. *Petals* free to the base, at anthesis slightly patent only at the tips, otherwise erect, fleshy, apically rounded, and with 2 small ligules inside near the base. *Stamens* free; anthers long; pollen-grains globular, not sul-

cate. *Ovary* inferior, with manifest epigynous tube. *Stigmas* leafy. *Fruit* an indehiscent berry. *Ovules* few, globose. Terrestrial stemless herbs, having the leaves armed with marginal spines.

F. LITORALIS Mez. (Phil. sub *Rhodostachys*).

Leaves glabrate above, with small dense appressed pallid scales underneath. *Inflorescence* rather many-flowered, terminal. *Bracts* broadly elliptical, acute, exceeding the flowers. *Sepals* oblong-lanceolate, the apex acuminate-mucronate.

(Chili); W. Patagon. (?)

Family 17. JUNCACEÆ. Rush Family.

Usually tufted grass-like herbs, or with subulate *leaves;* with small, regular *flowers*, often panicled; *perianth* 6-parted, its tepals dry, persistent; *stamens* 3 or 6, rarely 4 or 5; *ovary* superior, 3-carpellary, 1- or 3-locular; style 1. *Fruit* capsular; *seeds* 3 or more, rarely only 1.

Species 200, cosmopolitan, mostly in moist places.

KEY TO THE GENERA.

A. Flowers solitary, terminal, rather large.
  b. Leaf subtending flowers small, bract-like. Flowers 2–4 cm. long. Seeds scobiform. 1. *Marsippospermum*, p. 295.
  b2. Leaf subtending the flowers exceeding them; upper bracts equalling the flowers. Seeds obovate. 2. *Rostkovia*, p. 296.
A2. Flowers numerous, usually small. Perianth glumaceous.
  b. Leaf-sheaths open. Capsules many-seeded. 3. *Juncus*, p. 296.
  2b. Leaf-sheaths closed. Capsule 3-seeded. 4. *Juncoides* (*Luzula*), p. 301.

(*Distichia*, with diœcious flowers and closely imbricating 2-ranked leaves, is in the Bolivian Andes, reaching to the snow-line.)

1. MARSIPPOSPERMUM Desv.

Rush-like; *culm* 3 cm. long, terminally 1-flowered, surrounded by basal *leaves*, of which 1–2 are cylindric with short spout-like blade, the others are like barren culms. *Perianth-leaves* linear, the inner smaller. *Fruit* ovoid, 3-locular, parchment-like. *Seeds* with fine testa, appendaged at base.

Species 2 (*M. gracile* Buch. in N. Zeal.).

M. GRANDIFLORUM (Hook. f. sub *Rostkovia*).

Creeping. *Culm* rigid, terete, naked; *leaves* similar, but thicker and longer. *Flower* solitary, large, 3-bracted. *Perianth-leaves* linear, acute-subulate, slightly pungent, unequal; *anthers* long, 2-cusped, filaments short.

W. Patagon.; Magellan; Fuegia to Cape Horn; Falklands. Common in woody regions and swamps, to 400 m. high (Dusén); used for weaving into baskets (J. D. Hook.).

2. ROSTKOVIA Desv.

Rush-like, having a naked culm, often sheathed, and with one linear or terete *leaf*. *Flower* solitary, terminal, its perianth-leaves distinct. *Ovary* 1-locular; capsule globular-oblong, many-seeded.

Only 1 species, viz.:

R. SPHÆROCARPA Desv. (*R. magellanica* Hook. f.).

Rootstock not creeping. *Culm* 15–30 cm. high, compressed. Radical *leaves* plane, glabrous, sheathing and exceeding the culm. *Perianth-leaves* subequal, linear, acute, scarious-margined, as long as the capsule. Flower subtended by a long bract. (Fig. 6 in Eng. & Prantl, ii, 5, p. 6).

S. Patagon., Cordilleras (J. B. Hatcher; in fruit Feb. 15, 1897) in the rainy wood-region (Dusén); Fuegia to Cape Horn and Campbell's I. Rare in the steppes.

R. SPHÆROCARPA PUMILA Alboff. (sub v. *R. magellanica pumila*).

Small, 5–7 cm. high. Leaves longer. Perianth-leaves shorter, less acute. Style long.

Alpine, by Rio Grande near Ushuaia.

3. JUNCUS Linn. Rush.

Chiefly glabrous perennials, with scape-like culms, leaf-sheaths open at one side, leaf-blades terete or grass-like. Flowers variously panicled, often 1-sided. Seeds several, sometimes with tails.

Species 150, most in N. Temperate zone.

KEY TO THE SPECIES.

A. Lowest leaf of the inflorescence terete, like a continuation of the stem, with a seemingly lateral inflorescence.

b. Flowers bracteolate, inserted singly. Stamens 6.

c. Tepals green, acute, as long as the capsule. *filiformis.*
*c*2. Tepals with 2 chestnut stripes. *balticus.*
*c*3. Tepals brown-margined. *leseurii.*
*b*2. Flowers non-braceolate, inserted in heads on branches of the inflorescence. Tepals green. *maritimus.*
*A*2. Lowest leaf of inflorescence not continuing the stem. Inflorescence seeming terminal.
b. Leaf-blade flat or terete, not septate internally.
c. Flowers bracteolate, not in heads.
d. Inflorescence terminal, flowers remote, unilateral. *bufonius.*
*d*2. Flowers solitary in the axils, stamens 5–6. *depauperatus.*
*d*3. Inflorescence decompound; stamens 6. *graminifolius.*
*c*2. Flowers in heads, not bracteolate; fruit 1-celled.
d. Stamens 6. *dombeyanus.*
*d*2. Stamens 3. *planifolius.*
*b*2. Leaf-blades terete or flat, internally septate, not channeled above base. Tepals equal.
c. Erect, 20 cm. Cyme with 1-leaved involucre, with sessile glomerules. *microcephalus.*
*c*2. Low, 40 mm. Spikes in pairs. Leaves filiform. *schcuchzerioides.*
*b*3. Leaf-blade subulate, internally septate, channeled half way. *stipularis.*
*A*3. Leaf-blade semiterete, sulcate, rigid. Inflorescence depauperate, terminal; bract thrice longer. *chamissonis.*
*A*4. Leaves flat. Culm erect, compressed. Panicle lax. Annual. Tepals equal. *cyperoides.*
*A*5. Sheaths leafless. Culm compressed. Cyme lateral, diffuse. Tepals narrow, the outer longer. *mexicanus.*
*A*6. Tall, 60 cm. Cyme with outer rays long. Tepals ovate, inner obtuse, outer acute. Leafless. *procerus.*

1. J. ACUTUS Linn. Great Sharp Sea-rush.

Barren *culms* and outer *bracts* pungent. *Panicle* very compound, dense; clusters 2–4-flowered. *Perianth-leaves* half as long as the large, broad-ovate, acuminate, glossy-brown capsule; inner 3 with a broad membranous border at the apex.

(Eur., Brazil); Patagon., in salines near Carmen de Patagones.

Panicle more contracted than in the type.

2. J. BALTICUS Linn.

Rhizome creeping. *Culm* 30–60 cm., stiff, often prickly at top, obscurely striate. Pith continuous. *Panicle* erect, branched. *Tepals* subequal, ovate-lanceolate, very acute, as long as the elliptical, scarcely trigonous, obtuse, mucronate capsule. *Stamens* 6.

(Eurasia and Amer., chiefly near the sea); (Argentina); Patagon., along Rio Sta. Cruz, and Rio Chubut.

3. J. BUFONIUS Linn.

Annual, with fibrous cespitiferous roots. *Culms* 7–25 cm., diffuse, mostly simple, leafy. *Leaves* plane, subsetaceous, channeled. *Inflorescence* terminal, of 3–4 long, unequal, simple or bifid rays; *flowers* remote, solitary, unilateral; the upper fasciculate. *Tepals* narrow, acuminate, exceeding the oblong *capsule.*

(Old and New Worlds; Tasmania; Australia); Patagon., by Rio Sta. Cruz.

J. BUFONIUS VIRIDESCENS Buch.

Tepals longer.

At Rawson, Patagon.

4. J. CHAMISSONIS Kunth.

Culms cespitose, erect, rigid, sulcate-striate, leafy towards base. *Leaves* semi-terete, dorsally sulcate-striate, internally slightly canaliculate, rigid, shorter than the culm. *Inflorescence* terminal, depauperate, biradiate, with a floral leaf thrice longer. *Flowers* about 4 in the ray, unilateral, 6-staminate. *Tepals* ovate-oblong, acute, the inner slightly shorter. *Capsule* ovate-oblong, obtuse, muticous, triangular upwards; just exceeding the tepals.

(Chili); N. Patagon., not rare in meadows near Carmen de Patagones.

5. J. CYPEROIDES Laharp.

Culm erect, 10–12 cm., compressed, with 3–6 nodes. *Leaves* plane, flaccid, subnervose, on culms, 3–5. *Panicle* erect, compound, rather lax. *Spikes* 6–10-flowered. *Tepals* equal, linear-lanceolate, acute, shorter than the subpyramidal triquetrous capsule. Annual.

(S. Amer.); Chubut, common in hills near Carren-leofú.

6. J. DEPAUPERATUS Phil. (*J. mandoni* Buch.)

Densely cespitose. *Culm* 3–4 cm., low, stoloniferous, procumbent, apex erect. *Leaves* alternate, sheathing, the sheaths with ovate-obtuse auricles; blades 20 mm. long, channeled on upper face, hollow, not septate. *Flowers* solitary in the axils, naked, bractless; petiole 6 mm. *Tepals* 3-nerved, margins thin; inner broader than outer. Stamens 5–6, shorter than tepals. *Ovary* orbicular-trigonal, 1-locular, many-seeded.

(Bolivia, per Gray Herbarium; Chili); S. Patagon., Coy Inlet (Hatcher); E. Fuegia (Dusén).

7. J. DOMBEYANUS J. Gay. (*J. pallescens* Lam. p. p.)

Stout; 45 cm. high. *Culm* and *leaves* compressed-terete, nodulose. *Panicle* compound, rather dense; heads many, 8–10-flowered, globose; *flowers* large, *tepals* castaneous, lanceolate, acute, exceeding the oblong, mucronulate, black, shining *capsule; stamens* 6.

(Peru); S. Patagon.

8. J. FILIFORMIS Linn.

Culm slender, filiform, valleculate. *Sheaths* radical, leafless. *Inflorescence* scarcely compound, 5–7-flowered. Lower *bract* basilar. Upper generally mucroniferous. *Fruit* spherical-ovate, obtuse, 3-septate. *Seeds* tailless.

(Arctic-alpine of Eurasia-America, N. Zeal.) Patagonia, by R. Sta. Cruz.

9. J. GRAMINIFOLIUS E. Mey.

Small, glaucous with branching, leafy *culm*. *Leaves* striate, nerveless, the upper exceeding the decompound inflorescence. *Tepals* equal, lance-acuminate, shorter than the trigonal-elliptical, mucronate, 1-locular *capsule*. *Stamens* 6.

(Chili); Chonos Archipel.

10. J. LESEURII Bol.

Rootstock matted. *Stems* leafless and scape-like, sheathed at base. *Panicles* sessile, seemingly lateral, large; scape soft or hollow; spathe exceeding the panicle. *Flowers* somewhat secund. *Tepals* 5–6 mm., lanceolate-acuminate, brown-margined. *Stamens* 6, anthers exceeding the filaments. *Capsule* brown, oblong-ovate, acute, not beaked, nor exceeding the tepals. *Seeds* rather smooth, ovate, obtuse.

(California); W. Patagon.; in marshes by Carren-leofú.

11. J. MARITIMUS Lam. Lesser Sharp Sea-rush.

Culms naked with basal sheaths. *Leaves* terete, not septate, 45–60 cm., shorter than the culms. *Thyrse* decompound, erect, with many flowers in the dichotomies of the rays. *Tepals* equal, lanceolate, acute, as long as the elliptical, mucronate *capsule*. *Stamens* 6. *Testa* of seed sacculate at both ends.

(Cosmopol., Fig. in Brit. & Br. i, 384); Patagon. (Hatcher), the tepals acuminate, not mucronate, and castaneous in the center.

12. J. MEXICANUS Willd. (*J. compressus* H. B. & K.)

Root creeping, compressed. *Culms* cespitose, 4–5 cm., striate, glabrous, erect, compressed. *Sheaths* leafless, acute, pallid-fuscescent. *Cyme* lateral, branching diffuse. *Tepals* lanceolate, acutely subulate, outer ones slightly longer. *Style* long. *Capsule* triquetrous-oblong, acutish, equalling the sepals.

(S. Amer., Mexico); S. Patagon., in Isle Pavon, Rio Sta. Cruz, and Rio Chico near Chonkenk-aike.

13. J. MICROCEPHALUS H. B. & K.

Creeping cespitiferous root. *Culm* terete, erect, 20–25 cm., leafy. *Leaves* terete, articulate, glabrous. Inflorescence terminal, cymose, with a 1-leaved involucre, resembling the leaves but much shorter. *Flowers* capitately crowded in sessile glomerules. *Tepals* acuminate-cuspidate, subequal, exceeding the outer trigonal obtuse capsule. Varies in height of culm and size of inflorescence.

(S. Amer.); N. Patagon., common in wet places near Carmen de Patagones.

14. J. PLANIFOLIUS Brown.

Cespitose. *Culm* 25–45 cm. high, leafless. *Leaves* numerous, flat, grass-like, 2–7 mm. broad, shorter than the culm, with long imbricating 2-ranked sheaths. *Thyrse* terminal; bracts small, or 1–2 leafy. Globular clusters of brown flowers at base and ends of the branches. *Tepals* 2 mm. long, acute. *Stamens* 3. *Capsule* mucronate, equalling the tepals. *Seeds* numerous, ovoid, small.

(New Zeal.; Austral.; Chili); N. Patagon.

J. PLANIFOLIUS DEMISSUS Steud.

Culm leafy below, naked above, 10–15 cm. high, 1–several-headed. *Leaves* herbaceous, plane, lanceolate, shorter than the culm. *Sepals* subequal, the outer acute, the inner obtuse. *Stamens* 6. *Seeds* ovate, minute.

Valdivia; W. Patagon.

15. J. PROCERUS E. Mey.

Leafless (?). *Scape* smooth, soft (exceeding 60 cm.), finely striate, with dense pith. *Inflorescence* subdecompound, subcymose, the lower rays

very long. *Tepals* ovate, outer ones acute, inner ones slightly shorter, obtuse, mucronulate, scarcely exceeding the triquetrous-ovate, obtuse *capsule*.

(Chili); Chubut, in wet mountain places near Rio Carren-leofú.

16. J. SCHEUCHZERIOIDES Gaudich.

Rhizome jointed, long, rufescent. *Culm* low (25–50 mm.), basally clothed with sheaths and leaves. *Leaves* filiform, jointed, exceeding the culm. *Spikes* in pairs, terminal, 3–5-flowered, 2-bracted. *Tepals* equal, ovate-lanceolate, mucronate, equalling the subglobose, obtusely trigonal, mucronate *capsule*. *Stamens* 6, anthers usually exceeding the filaments.

Falklands; S. Patagon., in saline marshes along R. Deseado, and R. Sta. Cruz; Fuegia. (New Zealand?)

J. SCHEUCHZERIOIDES INCONSPICUUS Hook. (*J. inconspicuus* d'Urv.)

Small, scarcely 25 mm. high, densely cespitose; heads 1–3-flowered.

Falklands; Navarino I., Fuegia; S. Patagon., at Coy Inlet (O. A. Peterson, on pampas, Nov. 15, 1896).

17. J. STIPULARIS Nees & Mey. (*J. biflorus* Phil.)

Culm 5–10 cm. high, leafy, with ligulate, broad-margined sheaths. *Leaves* subulate, jointed by cross septa, equalling the culm. *Branches* of thyrse erect, 2–3-headed, the heads as large as a pea, 2–4-flowered, bracted. *Tepals* ovate-lanceolate, acuminate, as long as the obovate, apically trigonal *capsule*. *Anthers* shorter than the filaments.

(Chili); Magellan (Dusén); N. Patagon., along Rio Negro.

4. JUNCOIDES Adans. (1763. *Luzula* DC. 1805.)

Perennial, grass-like herbs, glabrous or sparingly cobwebby, the stems leafy, with closed leaf-sheaths. *Flowers* bracteolate, usually umbelloid or panicled. *Capsule* 1-locular, 3-seeded; *seeds* not tailed.

Species 40, widely distribted.

1. J. ALOPECURUS (Desv.).

Cespitose. *Leaves* plane, hairy on margin. *Panicle* contracted, glomerate, ovate-pyramidal, villous, erect. *Bracts* long, fimbriate-ciliate, subulately awned. *Tepals* ovate-lanceolate, narrow, subulate, dorsally fusces-

cent; the inner longer, carinate, awned, fimbriate, twice as long as the round, triangular, obtuse *capsule*.

Magellan and S. Patagon., mouth of Rio Gallegos (Dusén), pampas at Coy Inlet (O. A. Peterson). Fuegia, Ushuaia to Cape Horn; Falklands.

2. J. ANTARCTICUM (Hook. f. sub *Luzula*).

Small, cespitose. *Culm* 5 cm. high, slender, filiform, arcuate or erect. Leaves broad-linear-subulate, ciliate at the base. *Panicle* small, ovoid, woolly, nodding; bracteoles and *tepals* subequal, the margins hyaline, lacerate, scarious above, colored below. *Capsule* elliptical, half as long as the tepals. *Stigmas* 3, sessile-filiform.

Magellan and W. Magellan (Dusén); to high altitudes; S. Fuegia to Cape Horn.

Tepals larger than in *J. alopecurus*.

3. J. PATAGONICUM (Speg. sub *Luzula*).

Stem 20–40 cm. high, fistulous, its base fasciculate-leafy, 1 leaf at its midpart, the *leaves* grass-like, subglabrous, with callous apex. *Inflorescence* erect; *spikes* short and thick, more or less remote. *Tepals* subequal, the outer 3 lanceolate, awned, membranous, fuscous, the inner 3 obtusely acute, subhyaline. *Fruit* trigonal-ovate, just exceeding the perianth.

S. Patagon., by Lago Argentino. (By J. B. Hatcher in S. Patagon., only 10 cm. high.)

4. J. PUMILUM (Hook. sub *Luzula*).

Small, densely tufted, nearly glabrous, 30–60 cm. high. *Leaves* slender, shorter than culms, 12–25 mm. long, linear-subulate, obtuse, coriaceous, convex on back. *Culm* naked, 25–50 mm. Flowers in a small, 4–10-flowered head, 2 mm. long. *Bracts* ovate, the edges ragged. *Tepals* subulate or lanceolate, long-acuminate, chestnut-brown, twice as long as the black *capsule*.

(New Zeal., alpine); Fuegia.

5. J. RACEMOSUM (Desv. sub *Luzula*).

Root fibrous, bulbous-thickened, cespitose. *Culm* 30–70 cm. high, erect, leafy. Leaves plane or somewhat canaliculate, linear, acuminate,

their sheaths pilose-margined. *Panicles* nodding, consisting of spike-like racemes. *Bracts* ciliate. *Tepals* ovate-oblong, red-castaneous, the outer acute-mucronate, exceeding the acute, round-trigonal *capsule*. *Stamens* generally 3.

(S. Amer.); S. Fuegia. (Dusén.)

6. J. SPICATUM (DC. sub *Luzula*).

Plants rarely exceeding 15–20 cm. high, densely cespitose. *Leaves* generally distinctly canaliculate. Inflorescence of simple outline or lobate; spikes short, thickish, mostly nodding. *Flowers* 2.5–3 mm. long, variegated. *Tepals* castaneous, white-margined above. Stamens 6.

(Eur., N. Amer., alpine and arctic); Patagon. (On pampas near Coy Inlet, J. B. Hatcher. 25 cm. high; panicle dense, ovate, erect. Scape with 3 leaf-like bracts near the panicle.)

Family 18. LILIACEÆ. Lily Family.

Herbs, usually with bulbs or corms, rarely woody plants. *Flowers* usually hypogynous, regular, perfect and showy. *Perianth* leaves 6, occasionally 4, similar, usually not united; stamens of the same number, inserted on the base of the perianth; *anthers* mostly extrorse. *Ovary* mostly 3-celled; *style* 1, *stigma* 3-lobed. *Seeds* many, in 2 rows in each cell. *Embryo* in the axis of copious endosperm.

Species 1,300, widely distributed.

KEY TO THE GENERA.

A. Herbs, all with radical or basal leaves.
- *b.* Flowers umbellate, when not solitary on the scape.
  - *c.* Style 3-branched. Seeds few. 1. *Allium*, p. 304.
  - *c2.* Stigma 3-lobed. Seeds numerous. Perianth united below into a tube, funnelform to campanulate. 2. *Brodiæa*, p. 304.
  - *c3.* Stigma 3-lobed. Seeds numerous. Perianth united below, salver-shaped, often with scales in the throat. 3. *Tristagma*, p. 306.
- *b2.* Flowers paniculately racemose. Ovary 1-celled. Polygamo-diœcious. 4. *Astelia*, p. 307.

A2. Branching shrubs.
- *b.* Leaves 3–several-nerved, but not reticulate. Flowers pediceled, white. Perianth-leaves subequal. 5. *Callixene*, p. 307.
- *b2.* Leaves reticulately veined, and
  - *c.* 1-nerved. Flowers nearly sessile, large, pink. Perianth-segments unequal, the inner much larger. 6. *Philesia*, p. 308.
  - *c2.* 3–5-nerved. Flowers very large, on slender pedicels; perianth-segments subequal. Climbing. 7. *Lapageria*, p. 309.

1. ALLIUM Linn.

Bulbous herbs, with garlic odor, linear, sheathing, usually basal *leaves*, and simple, erect *scape*, bearing a bracted *umbel* of flowers; some of the flowers in some species becoming bulbils. *Ovary* with 1–6 *seeds* in each cell; *style* shortly 3-branched.

Species 275; chiefly extratropical in the Northern Hemisphere.

A. BONARIENSE Griseb.

Bulb 8 mm. diameter. Scape 7–12 cm. *Leaves* nearly 1 mm. broad. *Umbels* 3–5-flowered; *perianth* 8 mm. long, yellow (externally purplish when dry). *Perianth-leaves* distinct. *Style* twice as long as the ovary. *Cells* of ovary 6–10-ovulate.

(Uruguay); N. Patagon.

2. BRODIÆA Smith. (Including *Triteleia* Lindl).

Corm more or less coated. *Leaves* all radical, large. *Scape* simple, bearing a terminal umbel, or 1-flowered. *Perianth* funnel- to bell-shaped, its leaves subequal. *Stamens* on the tube, 6, or 3 of them barren; filaments short; *anthers* introrse. *Style* filiform, stigma 3-lobed. *Capsule* oblong in the marcescent perianth. *Seeds* numerous, black, often compressed.

Species 30, chiefly from Calif. to Chili. (Fig. in Eng. & Prantl, ii, 5, p. 57.) Subgenus *Triteleia* has staminal circle of unequal height, filaments filiform, all antheriferous.

1. B. AMEGHINOI Speg. (= *Tristagma ameghinoi* Speg.).

2. B. AUREA (Baker sub *Milla*).

Bulb globose, about 10 mm. diameter, tunicate. *Leaves* 6–8, fleshy, synanthic, filiform, 8 cm. long. *Scapes* 1–3, erect, 5–10 cm. long. *Valves* of spathe 2, lanceolate, basiconnate. *Umbels* 2–6-flowered; pedicels 14 mm. long. *Perianth* 10–12 mm. long, saffron-colored, its segments oblong, spatulate, spreading, 3–4-times as long as the short tube. *Stamens* slightly 2-seriate from the throat. *Ovary* sessile, cells 5–6-ovuled. *Style* 3 mm. long.

(Argentina); Patagonia.

3. B. LUZULA (Speg.) Macl. (*Luzula patagonica* Speg.) (Pl. Pat. austr. n. 366.)

Perennial, with fistulous stem, leafy at base, with a single leaf midway, and grassy, subglabrous, acute leaves at top. *Inflorescence* erect, with short, thick *spikes*, rather remote. *Tepals* subequal, 3 external, lanceolate-awned, 3 internal, obtusely acute. *Stamens* 6, all antheriferous. *Fruit* trigonal-ovate.

Patagonia, through its dry parts from Rio Chubut to Rio Gallegos, varying in height, and in the perigonial lobes having broad or narrow margins, and in the varying length of the pedicels.

B. LUZULA ANGUSTILOBA (Speg.).

Larger than the species, the *pedicels* equalling or surpassing the bracts, and having larger perigonium, its albescent tube with 5 green vittæ, and its lobes very narrowly linear without white margins.

4. B. PATAGONIA (Baker sub *Milla*).

Leaves 4–5, synanthic, filiform, 15–22 cm. long. *Scape* 1-flowered, about 12. cm. long; valves of spathe 2, erect, united at base. *Pedicels* 15 mm. long; *perianth* 22 mm., pale lilac; its segments lanceolate, acuminate, erect, twice as long as the tube. Ovary sessile; style 6 mm. long.

Patagonia.

5. B. PŒPPIGIANA (Gay sub *Triteleia*).

Leaves linear, plane, sometimes exceeding the 5–7-flowered scape. *Spathe* 2(3–4)-valved, the valves lanceolate, hyaline-membranous, rose-colored, as long as the pedicels, or shorter. *Perianth-lobes* oblong-obtuse, 8 by 3 mm. *Tube* as long as the lobes.

Patagon., by the mouth of Rio Chubut. (Dusén.)

6. B. SPEGAZZINII (Speg.) Macl. (*B. patagonica* Speg. non Baker.)

Bulb ovate. *Leaves* synanthic, narrow-linear, plicate, obtusish. *Scape* slightly longer, erect, glabrous, slender, 1-flowered, 2-bracted above. *Flower* subtubular, its segments linear, acute, as long as the tube, white, marked by a green line. *Pedicel* half as long as the flower. Plant green to violascent.

Patagon., common by Rio Sta. Cruz and Golfo de San Jorge.

3. TRISTAGMA Poepp.

Corm globular, truncate. *Leaves* few, radical, linear. *Scape* simple, leafless, bearing a few-flowered umbel, with scarious, involucral bracts. *Perianth* salver-shaped, with a cylindrical tube and 6 subequal, spreading lobes; mostly scales in the throat. *Filaments* short, inserted in the throat. Ovary ovoid; seeds numerous.

Species 3, Chili; Patagon.

1. T. AMEGHINOI Speg.

Staminal series unequal. *Bulb* ovate, 3.5–5 mm. diameter, 3–5 cm. in length. *Leaves* linear, plane, apically obtuse, *Scape* as long or shorter, erect, glabrous, slender, 1-flowered, 2-bracted. *Flowers* with rather long tube, their segments narrow-linear, thickish, velvety-papillose, olivaceous.

Patagon., in sandy meadows by Golfo de San Jorge. The cylindraceous floral tube and naked throat make this resemble *Brodiæa;* but the short style and the lobes being shorter than the tube place it in *Tristagma.*

2. T. AUSTRALIS Neger.

Bracts broad, lanceolate. *Leaves* obtuse, narrowing downwards. Pedicels only 2–5 mm. long. *Perianth-tube* ventricose, the lobes short, linear, with crown of 3–6, partly connate scales. Involucre 2-bracted, the *bracts* connate.

S. Patagon., Rio Guillermo. (O. Nordenskjöld.)

3. T. EREMOPHILA Speg.

Greenish, glabrous; the synanthous *leaves* linear, obtuse, plane, equalling or exceeding the narrower scape. *Spathe* basally connate-tubular, long-bifid upwards, the lobes narrow, hyaline to reddish. *Flowers* 2–5, with very short or long pedicels, erect or subcernuous; the perigon cylindrical to sublageniform, 6-lobed, the lobes narrow-linear, fleshy, acutish, slightly shorter than the dark-purplish tube; olivaceous, with naked throat.

Chubut; in rocky hills by Carren-leofú.

4. T. NIVALIS Poepp.

Bracts very narrow, almost linear. *Pedicels* 10–30 mm. long, differing in the same umbel. *Perianth-tube* cylindrical. *Leaves* very narrow.

T. NIVALIS ANGUSTIFOLIA Neger.

Leaves narrower than in the type.

E. Fuegia. (Br. Ansorge.)

5. T. PULCHELLA Speg.

Pallid green, glabrous, *Leaves* synanthous, plane, rather obtuse, equalling or exceeding the narrower scapes. *Spathes* scarcely connate-subtubular at base, bipartite; lobes broad-ovate, subobtuse, slightly albescent. *Flowers* solitary or geminate, sessile, erect, tube ovate-inflated, beautifully dark-violaceous, apically 5-lobed; the lobes arcuate-reflexed, fleshy, concolorous, nearly a half shorter.

W. Patagon., in the higher hills near Rio Aysen.

4. ASTELIA Banks & Sol.

Rhizome short, thick; stem leafy at base, supporting paniculate *racemes* of small, polygamo-dicœcious flowers. *Perianth* campanulate, its leaves united below. *Ovary* 1-celled; ovules numerous. *Fruit* fleshy, indehiscent.

Species 9, in Pacific Is., N. Zeal., Tasm., Austral., and Antarc. Amer. (Fig. in Eng. & Prantl, ii, 5, p. 75.)

A. PUMILA R. Br.

Leaves lanceolate, rigid, glabrous on both sides, 3-nerved, serrulate at apex. *Peduncles* 1-flowered, very short, the *flowers* inconspicuous, faintly sweet-scented (Fig. 54).

Falklands; Fuegia to Cape Horn, abundant, forming most of the peat; W. Magellan, at Puerto Angusto (Dusén); Staaten I.

FIG. 54.

Astelia pumila.— Flower.

5. CALLIXENE Juss. (1789). (*Luzuriaga* Ruiz. & Pav. 1798; *Enargea* Banks.)

Glabrous, branching shrub, with subsessile, prominently 3–many-nerved *leaves*, and white axillary *flowers* on slender pedicels. *Perianth-leaves* not united, spreading, subequal, nerveless, spotted. *Berry* subglobose, 3-celled, with few pallid seeds. (Eng. & Prantl, ii, 5, p. 86.)

Species 3, Chili, and the following.

1. C. MARGINATA Lam.

Knotted and leafless at the base. *Leaves* coriaceous, narrow-oval, thick at margin and midrib, subcuspidate. Flowers fragrant. *Filaments* filiform, anthers large, reflexed and extrorsely reversed. Berry dark purple.

Patagon.; Magellan to W. Magellan; Fuegia, Beagle Ch. to Cape Horn; Staaten I., Falklands; N. Zeal.

In Fuegia, "growing prostrate and against the trunks of beech trees"; in N. Zeal., "on mosses by woods." "Seems a transition towards *Philesia*, which the distribution favors."

2. C. POLYPHYLLA Hook.

Tall; much branching. *Leaves* abundant, oblanceolate or subovate, mucronulate, 5–7-nerved, with faint cross veins, glaucous underneath. *Peduncles* about as long as the leaves, below their middle articulated and 1-bracted. *Petals* white, acute, orange-spotted. *Anthers* incumbent.

S. Chili, at Cape Tres Montes; called "Asaju"; growing on trunks of trees, about 30 cm. long; remarkable for its beautiful flowers.

3. C. RADICANS Ruiz. & Pav.

Suffruticose, glabrous, several meters high. *Stem* terete, slender, flexuous, creeping along trunks of trees, jointed, sheathing and rooting at the joints, rootlets long, simple. *Leaves* sessile, lanceolate, oblique, acuminate, 9–13-nerved on both sides, 25 mm. long. *Peduncles* 2–4-flowered; *flowers* variegated, white to yellow, with red points and lines. *Berry* red.

(Chili); W. Patagon. (Dusén.)

6. PHILESIA Comm.

Glabrous, branching shrub, with nearly sessile, subdistichous, oblong, coriaceous, revolute-edged, 1-nerved, reticulate *leaves;* and large, showy, pink *flowers*, 1 or few in the upper axils or terminal; with few small imbricating *bracts;* inner *perianth-leaves* obovate-oblong, twice as long as the outer. *Anthers* extrorse. *Ovary* 1-celled, with 3 parietal *placentæ*. *Fruit* a subglobose berry, with many seeds.

Only species:

P. BUXIFOLIA Lam. (*P. magellanica* Gmel.) Plate XIII.

Flowers bell-shaped, 5 cm. long (smaller than in *Lapageria*), at right angles with the axis; *glands* at base of the inner perianth.

E. and W. Magellan; Cordilleras of S. Patagon. (in flower Dec. 20–Feb. 16; a shrub reaching to nearly 2 meters high—J. B. Hatcher); Fuegia to near Cape Horn. "Among the handsomest of the Antarctic American Flora. Northwards to Valdivia it is replaced by *Lapageria rosea*." (J. D. Hooker.) When not in flower it is difficult to determine its character as a monocot.

7. LAPAGERIA Ruiz. & Pav.

Branching, climbing shrub, with coriaceous, 3–5-nerved, reticulate *leaves*, whose short petiole is jointed below the blade, the lower part persisting-twisted. *Flowers* 1–few in the axils or terminal, large and handsome, with short peduncle and numerous small imbricate bracts. *Perianth-segments* distinct, connivent, the outer narrower; a basal nectary inside. *Anthers* introrse. *Ovary* 1-celled, with 3 parietal placentæ. *Berry* ovoid, subtrigonal, with many seeds.

Only species:

L. ROSEA Ruiz. & Pav.

Leaves lance-ovate to subcordate, acuminate. *Flowers* flesh-colored, sometimes white.

(S. Chili; also cult. in greenhouses); Patagonia (?).

Family 19. AMARYLLIDACEÆ.

Herbs (or tropical shrubs) from rhizomes or bulbs, with usually narrow, entire *leaves*, and large, showy, perfect *flowers*. *Perianth-leaves* 6, mostly united below, bearing 6 *stamens* on their base. *Ovary* wholly or partly inferior, 3-celled; style simple or 3-lobed. *Fruit* a many-seeded capsule; or fleshy and 1–3-seeded. *Seeds* oblong, mostly black.

Species 800, chiefly in warm countries.

KEY TO THE GENERA.

A. Rootstock bulbous.
  *b*1. Scape 1-flowered. Capsule 3-lobed. 1. *Zephyranthes*, p. 310.
  *b*2. Umbel 2–many-flowered. Capsule 3-celled. Anthers dorsifixed. 2. *Hippeastrum*, p. 310.
*A*2. Rootstock fasciculate. Capsule wrinkled. Terminal inflorescence or 1-flowered. Anthers basifixed. 3. *Alstrœmeria*, p. 311.

1. ZEPHYRANTHES Herb.

Glabrous herbs, with a *bulb* sending up narrow *leaves*, and a hollow, leafless 1-flowered *scape*. *Perianth* funnelform, usually with scales in its throat. Style 3-lobed. Capsule subglobose, 3-lobed.

Species 30, New World, from Tex. southward; 1 in W. Afr.

1. Z. ANDERSONII (Herb.) Benth.

Stamens unequal, declined (but often normal). *Perianth-scales* united into a membrane at the base of the filaments; anthers dorsifixed. (Fig. in Eng. & Prantl, ii, 5, p. 107.)

(Argentina); N. Patagon. Has golden-copper-colored flowers; and springs up commonly after rains.

2. Z. MELANOPOTAMICA Speg.

Euzephyranthes. *Bulb* ovoid, mediocre, fuscous-tunicate. *Leaves* narrow-linear, long, green, not synanthous. *Scapes* erect, more or less elongate, terete, glabrous. *Spathes* elongate, bifid below the middle, more or less long-connate, whitish. *Flowers* solitary or paired, erect, pedicels shorter than spathe. *Perianth* turbinate, mediocre, its leaves oblanceolate, acutish, white, twice as long as the unequal glabrous *stamens*, basally short-tubular-connate. Interstaminal scales small, pectinate-ciliate. *Style* rather long, included, trifid.

N. Patagon., in dunes along Rio Negro. Differs from *Z. mesochloa* Herb. by the leaves not being synanthous, and by the ciliate-pectinate character of its interstaminal squamules.

2. HIPPEASTRUM Herb.

Coated *bulb* sending up a fistulous *stem* with strap-shaped *leaves*, and a 2–many-flowered *umbel* (rarely 1-flowered), often large; with 2 distinct involucral bracts, often enclosing 1–many inner linear or filiform *bracts*. *Perianth-tube* short or long, the limb often zygomorphous. *Filaments* short; *anthers* dorsifixed, versatile. *Crown* of scales about or between the stamens small. Ovary 3-celled. *Seeds* many, black.

Species 50, in subtropical Amer. Section *Habranthus* has broad funnelform flowers, few in the umbel, and narrow leaves.

1. H. BAGNOLDI (Hrb.) Baker. (Baker's Handbook of Amaryllid., p. 43.)

H. BAGNOLDI MINUS Speg.

The variety has the *umbel* usually 2-flowered, and is smaller every way. *Bulb* subglobose. *Leaves* linear, 15–25 cm. long, subglaucescent. *Spathe* 2-leaved, yellow to white. Perigonium infundibuliform, yellow to rose or ferruginous, its leaves lanceolate, acute both ways. *Stamens*, 3 short, 3 long, anthers versatile. Interstaminal squamules minute, fimbriate. *Style* as long as the floral-leaves, shortly trifid.

Chubut, in meadows near Puerto Piramides.

2. H. PALLIDUM (= *Hippeastrum advenum* Herb. *Loddiges* sub *Habranthus*) Pax. (= *Habranthus hesperius* Herb.)

Leaves narrow-linear, subobtuse, fleshy, from the ovoid bulb. Scape leafless, 2-flowered. Flowers rather large, free-segments of broad funnel-form, yellowish-white to red perianth, ovate, acute.

(Description made from the Loddiges, *Botan. Cabinet*, plate 1760.)

(Chili); Chubut, meadows by Carmen-Leofú: sandy hills.

3. ALSTRŒMERIA Linn. p. p.

Rootstock fasciculate. *Stem* simple, erect, leafy, ending in an *umbel* or *raceme* of leafy-bracted flowers, or a solitary flower. *Perianth* funnel-form, its leaves nearly distinct, one of each series unlike the other two; inserted with the *stamens* on an epigynous persisting ring. *Anthers* basi-fixed. *Capsule* globose, rugose, with an annular crown. Seeds many, globose.

Species 30, S. Amer.

1. A. AURANTIACA Don.

Flowering stem reaching 1 meter high. *Leaves* 40–50, lanceolate, sub-petiolate, glaucous beneath, the lower 10 cm. by 12 mm. *Umbels* 10–30-flowered, with long compound rays; the *bracts* leaf-like. *Perianth* bright yellow, 4 cm. long, *outer tepals* subobtuse, green-tipped, 12–14 mm. broad; the *inner* narrower, deeper in color, claret-brown spotted. *Stamens* declinate, shorter than the tepals.

(Chili; cult. in gardens); Patagon.

2. A. DIAZI Phil.

Stem tall (30 cm.), leafy. *Leaves* rather crowded, not resupinate, lance-linear; involucral leaves similar. *Umbels* 3-flowered; peduncles scarcely

exceeding the involucre, naked. *Outer tepals* obovate-spatulate, not emarginate, serrulate, pink, their base and center white; the *inner* larger, purple-lined, yellow in the center; the lowest shorter, spotless.

(Amer.); Patagon., Chubut, in dry sandy hills.

3. A. LIGTU Linn.

Scape 45–60 cm. *Leaves* 20–30, thin, ascending, linear or lanceolate, 5–7 cm. long, .5–1 mm. broad. Umbel 3–8-rayed, rays often forked, 5–7 cm. long; bracts several, linear, 25–35 mm. long. Perianth 35 mm. long; the outer segments obovate, unguiculate, obtuse or cuspidate, 12 mm. broad, whitish or pale lilac or pale red, with oblique, purple streaks, the inner segments narrower and more acute. Stamens shorter than the segments.

Patagon., meadows near Lago Nahuel-huapi; along Rio Chubut.

4. A. PATAGONICA Phil.

Low, 1-flowered. *Leaves* linear, narrowed at base, acute, undulate. *Flower* 18 mm. long, its outer leaves spatulate, mucronate, yellow inside, pinkish halfway on outside; inner perianth-leaves narrower, purple-spotted to the middle. Stigmas revolute, elongate, broad, margined. Leaves more numerous and narrower than *A. pygmæa*, and inner tepals red-spotted.

Near Lago Sta. Cruz, Patagon.; S. Patagon., on high dry pampas near Coy Inlet (Hatcher); "yellow, with dark spots on the corolla."

5. A. PYGMÆA Willd. (*A. ligtu pygmæa* O. Ktze.)

Underground stem 5–10 cm. long, sending up a dense tuft of linear or lanceolate *leaves*, 12–25 mm. long. *Flower* solitary, sessile amid the leaves; its *perianth-leaves* oblanceolate, unguiculate, whitish, unspotted, 12–18 mm. long, 2–3 mm. broad. *Stamens* as long. "Flower unspotted."

(Peru and Bolivia to 4,000 meters); Gregory Bay, Fuegia, by R. O. Cunningham; N. Fuegia, near sea-coast, Dusén.

Family 20. IRIDACEÆ. Iris Family.

Perennial herbs, with narrow mostly equitant, distichous *leaves*, and perfect, mostly regular, showy *flowers* in spathes. *Perianth* 6-parted, in 2 series, its tube adhering to the inferior 3-locular *ovary*. *Stamens* 3, on the base of the outer tepals; *anthers* extrorse. *Style* 3-cleft, its branches

often petaloid and subdivided. *Embryo* enclosed in horny or fleshy endosperm.

Species 1,000, cosmopolitan.

Generic Analysis.

A. Style-branches forked. Bulbous plants. Tepals subsimilar.	1. *Nemastylis*, p. 313.
A2. Style-branches simple. Usually with rhizomes.	
b. Filaments free, or connate only at base.	2. *Libertia*, p. 313.
b2. Filaments partly united into a tube.	
c. Spathe many-flowered.	
d. Perianth-tube short	3. *Sisyrinchium*, p. 314.
d2. Perianth-tube rather long.	4. *Symphyostemon*, p. 318.
c2. Spathe 1-flowered. Low, cespitose plants.	5. *Tapeinia*, p. 319.

1. NEMASTYLIS Nutt.

Bulbs usually sending up branching stems with long, linear, folded *leaves*, and 1 or more pediceled *flowers* from the spathe. *Tepals* all similar, fugacious. *Filaments* partly united. *Style-branches* filiform, themselves forked, alternate with the anthers. *Capsule* subovoid.

(Fig. in Eng. & Prantl, ii. 5, p. 148.)

Species 10, S. Amer. and N. to Tenn.

N. FURCATA Klatt.

Stem 25 cm. high, simple below, flexuous, glabrous; *leaves* long, lance-ensiform, the base broad-sheathing; cauline leaf basi-cucullate. *Bracts* ovate-lanceolate, keeled, cuspidate, thin-margined. Spathe 1-flowered, 2-valved. *Flowers* erect, yellow, *anthers* yellow. *Seeds* castaneous.

(Montevideo); N. Patagon.

2. LIBERTIA Spreng.

Rhizomes creeping. Leaves basal, distichous; the few *stem-leaves* reduced. *Flowers* in simple or compound umbels, the *inner tepals* larger than the outer, white or greenish; stamens 3, free or basi-connate; styles alternate with the anthers, involute-filiform, the *spathes* not enclosing the pediceled flowers.

Species 8, some in Chili, others in N. Zeal. and S. Australia. (Fig. in Eng. & Prantl, ii, 5, p. 150.)

1. L. ELEGANS Poepp.

Panicle of many peduncled, 4–6-flowered umbels. *Inner perianth* white, outer green. *Filaments* connate.

(Chili); by R. O. Cunningham (in Patagonia?).

2. L. FORMOSA Graham.

Stem terete, leafy; radical leaves not equalling the stem, smooth-edged. Outer tepals ovate, carinate, greenish at apex; inner tepals unguiculate, cordate, retuse; fruits smaller than the flowers.

(S. Chili); Valdivia. (Fig. in Eng. & Prantl, l. c.)

3. SISYRINCHIUM Linn.

Rhizomatous, slender herbs, with narrow *leaves*, radical or from the base of the stem, and single terminal *spathe*, or with additional spathes sessile along the stem. *Tepals* all similar, often awned. *Style-branches* filiform, undivided, alternate with the anthers. *Capsule* ovoid or globular.

Species 50, chiefly in warm parts of Amer. and stragglers in Austral., Mauritius, Ireland, Bermuda; several in E. U. S. (Fig. in Brit. & Br. i, 453.)

A. Dwarf.
- *b.* Stem low, densely leafy, about 1-flowered. — *humile.*
- *b.* Stemless, with yellow flowers. — *clarazii.*

A2. Filaments free from near the base. — *filifolium.*

A3. Filaments free upwards. Flowers expanded, yellowish.
- *b.* Scape subcompressed; leaves grass-like. — *graminifolium.*
- *b2.* Scape compressed. Tepals, 3 of them with large, dark spots. — *maculatum.*
- *b3.* Scape narrowly winged; tepals brown-striate. — *striatum.*
- *b4.* Stem flat and winged; tepals brown-striate. — *patagonicum.*

A4. Filaments connate; flowers expanded, blue or pink to white, with purple stripes.
- *b.* Stem 2-winged; tepals subspatulate, retuse, mucronate. — *chilense.*
- *b2.* Stem 2-edged; tepals hairy outside. — *iridifolium.*
- *b3.* Stem terete, and leaves terete. Flowers pink.
  - *c.* Stem striate, leafy below. — *junceum.*
  - *c2.* Stem with a leaf some distance below. — *middletoni.*
  - *c3.* Stem smooth, naked. — *roscum.*

1. S. CHILENSE Hook.

Stem branching, 2-winged. *Leaves* linear-ensiform, acutish, striate, much shorter than the scape. *Spathes* linear, acute, usually exceeding the pedicel. *Tepals* oblong, subspatulate, retuse, mucronate.

(Trop. Amer.); N. Patagon.; S. Patagon.; E. and S. Fuegia (Dusén).

2. S. CLARAZII Baker.

Dwarf acaulescent, tufted, yellow-flowered, with a 2-edged *flower-stalk*, rigid, 7-ribbed *leaves* about 1 mm. broad. *Perianth* 6 mm. long.

Probably in N. Patagon. It and *S. chilense* are used in infusions for tea.

3. S. FILIFOLIUM Gaudich. (*S. leucanthum* Colla.)

Stem terete, striate, several (2–8)-flowered. *Leaves* radical, filiform, nearly equalling the scape, produced beyond the bracts to a long spathe. *Flowers* showy, broad-campanulate, 12 by 12 mm., the *tepals* obovate, subequal, white with purple veins. Filaments free nearly to the base. *Capsule* glabrous, its cells 3–6-seeded (Fig. 55).

FIG. 55.

Sisyrinchium filifolium. Inflorescence and flower; essential organs, and cross-section of dehiscing fruit. (After *Flora antarctica.*)

S. Patagon., Fuegia; Falklands. By O. W. Peterson and J. B. Hatcher, near Coy Inlet, at Cobo Negro, and near head of Rio Chico de Sta. Cruz; at Killik Aike on Rio Gallegos (Dusén); "Star-grass; color white with brown stripes. Handsomest and most fragrant in Patagonia. On pampas everywhere." (Peterson.) "White at high latitudes, pink at lower." (Hatcher.) "In the Falkland Islands the grassy plains are, in the spring month of November, almost whitened by the profusion of its pendulous snowy bells." (J. D. Hooker.)

(Index Kewensis gives *S. filifolium* and *S. leucanthum* as distinct species. Klatt identifies them.)

4. S. GRAMINIFOLIUM Lindl.

Scape 60 cm. high, subcompressed. *Leaves* erect, 6–10 mm. wide, strongly striated, glaucous, rigid, exceeding the scape. *Capsules* shorter than the pedicels, ovoid-globular.

S. Patagon., Eden; E. Fuegia. (Br. Ansorge.)

5. S. HUMILE Phil.

Stem only 10 cm. high, densely leafy, about 1-flowered, the *leaves* distichous, acute, 5–10 cm. long, exceeding the flower, "Cetera *S. cuspidati.*"

(Chili); S. Patagon., by Rio Sta. Cruz; Gregory Bay.

6. S. IRIDIFOLIUM (Humb. & Bonpl.) Kunth. (*S. laxum* Link.)

Stem branching, leafy, 2-edged; its edges and the leaf-edges scabrid. *Spathes* terminal, glabrous; peduncles geniculate. *Tepals* ochroleucous, hairy below externally. *Staminal* column inflated, bearded below. *Ovary* pubescent; *capsule* glabrous.

(Caraccas to Chili); Magellan; Fuegia (Speg.). Often confounded with *S. chilense*. "N. Patagon." (Lor. & Nied.)

S. IRIDIFOLIUM MAJUS. (*S. laxum* var. *major*.)

Stem bifid. *Leaves* and *tepals* broader. *Spathes* and *bracts* scaberulous above.

W. Patagon., in Chonos Archipelago.

S. IRIDIFOLIUM MINUS.

Stem simple. *Leaves* narrower, glabrous. *Tepals* narrower.

Magellan.

7. S. JUNCEUM Meyer. (*S. gracile* Phil., *S. junciforme* Poepp.)

Glabrous. *Stem* terete, striate, one third way leafy. *Leaves* terete, striate, shorter than the scape. One valve of the *spathe* long, straight. *Flowers* in a lateral fascicle, pink; *tepals* lanceolate, acute, 3–5-striate. *Staminal* column inflated. *Stigmas* small, dentiform. *Capsule* oblong.

(Andes); Fuegia, Navarino I., Ushuaia; Patagon., Chubut; Valley of R. Gallegos (Nordenskj.); R. Sta. Cruz.

S. JUNCEUM BREVISPATHUM (O. Ktze.).

About 30 cm. high; few-flowered. *Spathe* scarcely exceeding the inflorescence.

Patagon.

S. JUNCEUM FLORIBUNDUM Phil.

To 60 cm. high; many-flowered. Spathe scarcely exceeding the inflorescence.

Patagon.

S. LEUCANTHUM Colla (see *S. filifolium*).

8. S. MACULATUM Hook.

Stem leafy, ancipitally-compressed. *Leaves* linear, ensiform. *Pedicels* as long as the spathe, white-membranous, acuminate. *Perianth-segments*

obovate, acute, 3 with large, dark, sanguineous spots. *Stigmas* subulate. *Ovary* glandular. Herb scarcely exceeding 30 cm. high, with a *panicle* of several yellow flowers.

(Chili); S. Patagon.; Fuegia, in dry meadows.

9. S. MIDDLETONI Bak. (*S. roseum* Speg., Pl. Pat. Aust. n. 357, non Ph.)

Root fibrous, densely tufted, long-cylindrical. Stem slender, terete, erect, a foot long, ending in a single cluster of flowers, with a terete leaf some distance below. Leaves 2–3, slender, terete, half as long as the stem. Spathes 1–2-flowered, 25–32 mm. long; valves lanceolate, green, with narrow white edge. Perianth-segments oblanceolate-oblong, 8 mm. long. Filaments connate to the apex in an ampulliform tube.

S. Patagon., meadows by Rio Sta. Cruz; Golfo de San Jorge; by Rio Chubut.

10. S. PATAGONICUM Phil.

Root-fibers slender. *Stem* simple, leafless, 12–15 cm. high, flat, winged to base, 2 mm. diam. *Leaves* linear, 2 mm. diam., shorter than the stem. *Flowers* 2–3 in a cluster. *Valves* of spathe lanceolate, 25–35 mm. long; *pedicels* much shorter. *Perianth* 8 mm. long, yellow, with brown veins. *Filaments* 3 mm., connate upwards; *anthers* small, oblong.

W. Patagon., by Rio Palena.

11. S. ROSEUM Phil.

Stems terete, smooth, 30 cm. high, scarcely 2 mm. thick, naked, produced to a long spathe. *Leaves* terete, striate, shorter than the scape. *Spathes* broadly scarious. *Pedicels* exserted. *Flowers* pink, 14 mm. long, *tepals* 7-nerved. *Staminal* column inflated midway, glabrous, scarcely half as long as the perianth. *Ovary* villous.

(Chili); Patagon., Golfo de San Jorge.

12. S. STRIATUM Smith.

Root-fibers slender. *Stems* stout, narrowly winged, 45–60 cm. high, bearing 1–2 reduced leaves above, next the inflorescence. *Spike* or panicle of many diverging sessile clusters; each 12–20-flowered, and subtended by a large ovate *bract*. *Root-leaves* 8–10, fine-linear, 30 cm. by 12 mm. Valves of *spathe* under 25 mm.; inner valves numerous, membranous.

Perianth 18 mm. long, its segments oblanceolate, pale yellow, veined with brown. *Filaments* united half-way. *Capsule* globose, 6 mm. diam.

(Chili & Andes., cult.); Patagon., in foothill and mountain meadows.

S. STRIATUM MICROSPATHUM (Phil.).

In rocks by Nahuel-huapi.

4. SYMPHYOSTEMON Miers. (*Susarium* Phil. p. p.)

Roots fibrous. *Leaves* linear, radical. *Scapes* short, amid the leaves or longer, sometimes 1-leaved. *Spathes* 1–2, sessile or stalked, each with pediceled flowers. *Perianth* funnelform, its *tepals* distinct, white, yellow or purple-striped. *Filaments* united. *Style branches* clavate. *Capsule* ovoid, protruding from the spathe. *Seeds* angled.

Species 5, extratrop., S. Amer.

1. S. BIFLORUS (Thunb.) Bak. (*S. narcissoides* Cav., Miers.)

Rhizome none. *Radical* fibers tufted. *Leaves* numerous, narrow-linear, 15–30 cm.; *scape* terete, 30–45 cm. long; bearing 1–2 long-peduncled clusters. *Spathes* 4–5-flowered, 25–35 mm. long, the outer valve oblong-lanceolate, green, with a membranous edge. *Pedicels* long. *Perianth* pale-yellow, 30–37 mm. long; the *segments* oblong, acute, equalling the funnel-formed tube. *Filaments* free above, *anthers* versatile. *Capsule* subglobose, 6–8 mm. diameter.

(S. Chili); Magellan; N. & E. Fuegia, "belonging to the Steppe-Flora." (Dusén.) "Blue-white bells streaked with purple." (R. O. Cunningham.) Got by Hatcher at Rio Coy.

FIG. 56.

Symphyostemon lyckholmi. Inflorescence and flowers (after Dusén).

2. S. LYCKHOLMI Dusén.

Root fasciculate. Stem erect, terete, rough, simple. Radical leaves 2–3, rough, linear-terete, attenuate-sheathing. Outer bracts 2, shorter than the upper leaf, lanceolate, embracing each other, white, scarious-margined. Flowers 3–4, their pedicels scarcely exceeding the bracts; their tube dilated upwards, their 5–6 lobes broad, subacute, with purplish lines. Filaments united (Fig. 56).

Differs from *S. patagonicus* Speg. by its rough stem and leaves, and its broad, less pointed tepals.

S. Patagon., at 600 m. elevation. O. Nordenskj.

3. S. ODORATISSIMUS (Lindl.) Miers.

Flowers larger than in *S. patagonicus*, and perigonial tube shorter.

Patagon., Golfo de San Jorge, RR. de Sta. Cruz et Gallegos; Gregory Bay.

4. S. PATAGONICUS Speg.

Glabrous. Roots fascicled. Leaves narrow, shorter than the stem, callous-mucronate. Flowers numerous, pediceled, somewhat salver-shaped and nutant; the lobes erect, ovate, apiculate, marked by 5 longitudinal, rather broad dark purple lines, exceeding the slender, cylindrical tube. Scape 15–25 cm. high, bearing a single leaf above the middle, also 2 apical bracts, mutually embracing. Ovary obconical-turbinate, 4 by 2.5 mm. Flowers smaller than in *S. biflorus*, but their tube longer.

Patagon., on sandy plains by Golfo de San Jorge.

5. S. SEGETHI (Phil. sub *Susarium*).

Rhizome and stem creeping. *Leaves* terete, hollow, rigid, equalling the scape, 24 cm. high. *Flowers* subsessile, fascicled, violaceous. *Flower-tube* very narrow, *filaments* united. *Ovary* lanceolate. *Seeds* winged above and below.

(Chili); Patagon., in dry meadows by Teka-choique and Carren-leofú.

5. TAPEINIA Juss.

Low, cespitose perennials, with fibrous *roots*, crowded, distichous, linear *leaves*, and terminal *scape* with 1-flowered pedicel which scarcely exceeds the leaves. *Perianth* bell-shaped, with the tube almost wanting, its *tepals* ovate, the inner narrower. *Filaments* united below. *Style* filiform, its branches subulate. *Capsule* globular, 3-furrowed, dehiscing at the apex.

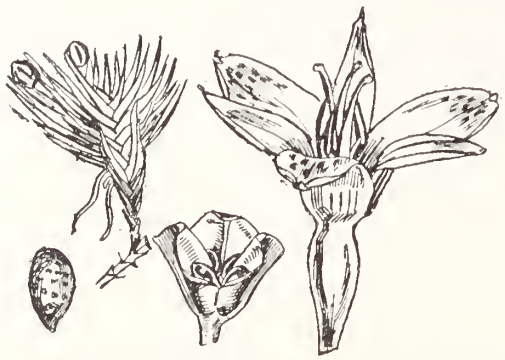
The only species.

T. MAGELLANICA (Lam.) Ker.

Leaves subulate, canaliculate, rigid. *Flowers* small, whitish-yellow (Fig. 57).

(Chili); Magellan, and W. Magellan (Dusén); Fuegia to Cape Horn. Extends farther S. and to greater elevations than the species of *Sisyrinchium*. Moist meadows, especially on mountains.

FIG. 57.



Tapeinia magellanica. Leafage, flower, seed, and dehisced capsule. (After *Flora antarctica*.)

Family 21. ORCHIDACEÆ. Orchid Family.

Perennial, tuberous, or rhizomatous, or epiphytic herbs, with entire sheathing *leaves*, and superior perfect, zygomorphous, showy *flowers*. *Perianth* 2-seriate (calyx and corolla both petaloid), each 3-leaved; the *sepals* all similar; the 2 lateral *petals* or 'wings' similar; the third petal becomes anterior by torsion, and forms a *labellum*, being also frequently spurred. *Stamens* 1–2, gynandrous; only 1, rarely the two, antheriferous; *pollen* cohering in 2–8 pear-shaped masses. *Ovary* inferior, 1-celled, with 3 parietal *placentæ*, often long and twisted, its *style* united with the staminal column in a *gynandrium*, forming a stigmatic *rostrum*. *Seeds* exceedingly numerous and minute, having no endosperm.

Species 5,000, abounding most in the tropics.

KEY TO THE GENERA.

1. Single leafy stem with a terminal spike or raceme. *Chloræa.*
2. Leaves whorled about midway on a 1-flowered scape. *Codonorchis.*

1. CHLORÆA Lindl. (Including *Asarca* Lindl.)

Anther 1, erect behind the rostrum, 2-celled, and each cell partially 2-celled. *Pollinia* 2-parted, oblong. *Rhizomes* bearing simple leafy stems with flowers on a terminal spike or raceme. *Posterior sepal* sometimes erect, arched. *Petals* narrow, the *labellum* incurved, ascending from the base of the column, spurless, open on the upper side, and sometimes with 2 *calli*.

Species 80, confined to extratropical S. Amer.

KEY TO THE SPECIES.

A. Stem leafy.

b. Leaves dimorphous; the basal narrow-lanceolate, long-petiolate; the upper broad and sheathing. Flowers large and whitish. *bugainvilleana.*

*b*2. Leaves oblong-lanceolate, obtuse, petiolate; the cauline acute, sessile; flowers very yellow. *commersonii.*
*b*3. Leaves lanceolate, acute; bracts large. *gaudichaudii.*
*b*4. Stem with 3 leaves, which wither at anthesis. Bracts sheath-like, linear-ligulate. *penicillata.*
*A*2. Leaves chiefly basal.
b. Leaves lanceolate, acuminate. *kingii.*
*b*2. Leaves subelliptical, obtuse.
c. Spike 3–7-flowered. Bracts ovate-lanceolate. *magellanica.*
*c*2. Spike long, lax; bracts lanceolate. *odoratissima.*
*A*3. Spike 16 cm. long, about 18-flowered. Lower bracts longest, all exceeding the flowers. Labellum rhombic, lobed. *patagonica.*
*A*4. Flowers rose-white.
b. Spikes 10–15-flowered; flowers small; labellum partly pectinate. *albo-rosea.*
*b*2. Spike 10-flowered; flowers large; labellum serrate-toothed, warty. *pleistodactyla.*
*b*3. Spike 3–6-flowered; flowers large; wings and entire labellum yellowish. *spegazziniana.*
*b*4. Spike 2–3(6)-flowered; flowers obscure; labellum 2-lobed, papillose. *hystrix.*
*A*5. Spikes 2–3-flowered; flowers large, green-white; labellum 3-toothed. *leontoglossa.*
*A*6. Spikes 2–4-flowered; flowers rusty; labellum 3-lobed. *ferruginea.*

1. C. ALBO-ROSEA Kraenzlin & Speg.

Spikes 10–15-flowered. *Flowers* small, the wings apically very thick-clavulate. *Labellum* short, apically obtuse-callous, the rest densely pectinate-fimbriate. *Tepals* rose-white; bracts rose colored.

S. Patagon., in elevated meadows along Rio Chico; by Rio Carrenleofú.

2. C. BUGAINVILLEANA Franchet.

Stem 15–30 cm. high. *Leaves* dimorphous, narrow-lanceolate and long-petioled in sterile fascicles, and ovate cauline leaves, the upper being long-sheathing, short and complicate. *Flowers* 4–7, rather large, with short pedicels. *Bracts* ovate, mucronate-setaceous, embracing the flower. Perianth white, tesselated with black lines; *sepals* longer than the petals. *Labellum* long-stipitate, obscurely 3-lobed, 7-crested, with inflexed fimbriate margins.

Magellan (Commerson, 1767).

3. C. CHICA Krnzl. & Speg.

W. Patagon., not rare in the woods along Rio Aysen. (To be described in F. Kraenzlin's *Monograph of Chloræa.*)

4. C. COMMERSONII Brongn. (Lindl. sub *Asarca.*)

Stem leafy. Lower *leaves* oblong-lanceolate, obtuse, petiolate; upper acute, sessile. *Spikes* dense; bracts lanceolate, acute, as long as the ovary. *Perianth* very yellow; the sepals narrow, acute; the *petals* shorter, obtuse; the *labellum* still shorter, its lateral lobes round, entire, its midlobe ovate, warty; adnate to the base of the short, winged gynandrium.

Magellan; Fuegia, Ushuaia; Falklands. Patagon., in woods near Lago Fontana.

5. C. FERRUGINEA Krnzl. & Speg.

Spikes 2–4-flowered, *flowers* slightly large, all more or less intensely ferruginous; *wings* acute, not or scarcely callous-thickened. *Labellum* trilobate; midlobe narrow, its upper surface densely and minutely papillose-verrucose.

Patagon., frequent in colline meadows near Rio Carren-leofú.

6. C. HYSTRIX Krnzl. & Speg.

Spikes 2–3-, or even 6-flowered; *flowers* rather obscure, like *C. leontoglossa*, but wings more thickened at the apex. *Tepals* white-rose, more nervose-reticulate. *Labellum* apically callous-bilobed, medially enlarged, densely hirt-papillose.

Patagon., hills between Teka-choique and Carren-leofú.

7. C. GAUDICHAUDII Brongn.

Stem leafy, the *leaves* lanceolate, acute. *Bracts* large, lance-ovate, exceeding the ovary. *Sepals* ovate-lanceolate, membranaceous to the apex. *Petals* subequal, obtuse; the *labellum* shorter, its lateral lobes fimbriate, thick at the apex, its midlobe linguæform, warty. *Gynandrium* as long as the labellum, its rostrum winged.

Magellan, moist pastures of Fuegia and Falklands.

8. C. KINGII. (Hook. f. sub *Asarca.*)

Radical *leaves* 15 cm. long, lanceolate, acuminate. *Spike* 6–8-flowered. Lateral *sepals* lanceolate, acuminate. *Petals* oblong, ovate, obtuse, slightly shorter than the sepals and the labellum; *labellum* shortly unguiculate, oblong, obtuse, entire, its nerves scarcely thickened. *Gynandrium* short.

Magellan.

9. CHLORÆA LEONTOGLOSSA Krnzl. & Speg.

Spikes 2–3-flowered; *flowers* erect, rather large. *Wings* greenish, rather fleshy on the anterior part; the other *tepals* whitish, laxly and finely fuscous-striate and reticulate. *Labellum* somewhat short, apically 3-dentate, and callous.

Patagonia, in woods near Lago Fontana.

10. C. MAGELLANICA Hook. f.

Stem 30–45 cm. high. *Leaves* elliptical and lance-elliptical, obtuse, the upper subacute. *Spike* 3–7-flowered. *Bracts* ovate-lanceolate, exceeding the ovary. *Flowers* pale-yellow; the sepals linear, thickened distally and the apex inflexed. *Petals* one third shorter, ovate-obtuse; *labellum* ovate-cordate, obsoletely 3-lobed, shorter than the sepals, margins inflexed with long glands, the axis crested; the lobes sublacerous laterally, and produced medially.

Magellan (Hatcher); N. Fuegia (Dusén). Navarino I.; Ushuaia. S. Patagon., by Rio Gallegos (O. Nordenskjöld); by Lago Argentino.

11. C. ODORATISSIMA. (Poepp. sub *Asarca.*)

Leaves elliptical-oblong, subobtuse. *Spike* long, lax. *Bracts* lanceolate, exceeding the ovary, apically incurved. *Upper sepal* oval, acute; lateral ones lanceolate-acuminate, thickened. *Petals* obliquely oval, subobtuse. *Labellum* with base adnate to the short gynandrium, its lateral lobes oboval, obtuse, its terminal longer and narrower, apex dentate.

Falklands; Patagon., south provinces.

12. C. PATAGONICA Phil.

(Leaves and stem unknown.) *Spike* many-flowered. Upper sepal lanceolate, lateral ones linear, thickened apically. *Petals* falcate, their margin concave, warty. *Labellum* rhombic, obsoletely lobed, veins of lateral lobes varicose, the apex few-toothed, with central falcate setæ; midlobe triangular, toothed, varicose-edged.

Patagonia, near Valdivia.

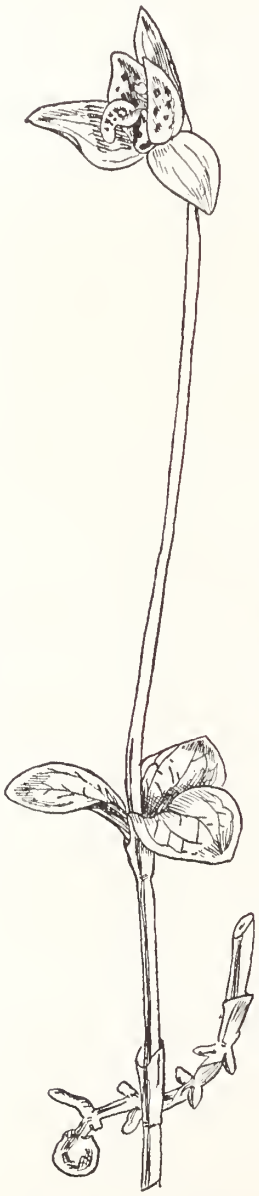
13. C. PENICILLATA Reichb. f.

Stem 30 cm. high, bearing 3 *leaves*, these emaciate at anthesis; bracts sheath-like, linear-linguæform, exceeding the trigonal *ovary*. *Sepals* and

wings apically ligulate. *Labellum* cuneate, ligulate at the base, puberulous in the mid-line, anteriorly revolute on both sides; the margins with narrow, subulate processes, which are opposed internally by triangular calli; also an apical obtuse callus.

Beautiful. Patagon., Fuegia, Orange Harbor.

FIG. 58.



Codonorchis lessonii.

14. CHLORÆA PLEISTODACTYLA Krnzl. & Speg.

Spikes long, about 10-flowered. *Flowers* rather large, tepals white-rose; *wings* apically more or less attenuate and infuscate, callous-thickened; *labellum* broad-ovate, serrate-dentate, densely verruculose-appendiculate.

Patagon., not rare in hills near Carren-leofú.

15. C. SPEGAZZINIANA Krnzl. & Speg.

Spikes 3–6-flowered; flowers rather large; wings apically thick, fuscate-callous, basally yellow. *Sepals* white-rose, obscurely and densely clathrate-nervose. *Labellum* yellow, slightly obtuse, entire, sparsely papillose, verrucose.

Patagon., common in mountain meadows by Carren-leofú.

2. CODONORCHIS Lindl. (*Pogonia* Juss. p. p.)

Tuberous, with 3–6 *leaves* in a whorl about midway on a 1-flowered scape. *Petals* exceeding the sepals. *Labellum* free, spurless, sessile, or attenuate downwards, surrounding the gynandrium.

Species 2, in extra-trop. S. Amer. (Sometimes included in *Pogonia*, which has a solitary leaf on the scape.)

C. LESSONII Lindl. (*Pogonia tetraphylla* Poepp. & Endl.)

Leaves mostly 3 in the whorl, broad-ovate, petioled. *Flower* large, white, marked with purple (Fig. 58).

S. Chili, S. Patagon., at Cabo Negro and Punta Arenas (Hatcher; in flower, Jan., 1897). Fuegia. Staaten I. Falklands.

Class II. DICOTYLEDONES. Exogens.

Seeds with a dicotyledonous embryo. Flowers mostly 5- or 4-merous, occasionally 2- or 3-merous. Stem exogenous. Leaves with reticulate venation.

Including families 22–113.

Family 22. SALICACEÆ. Willow Family.

Diœcious shrubs or trees, with light, brittle wood, simple, alternate, stipulate *leaves* (the *stipules* sometimes fugacious or obsolete); *flowers* of each sex in catkins, the individual flowers in the axils of bracts, each subtended by a *disk*, but without perianth. *Male flowers* 2–many-staminate. *Female flowers* with a free 1-celled *ovary* having many erect ovules. *Seeds* plumose, without endosperm.

Species 200, in 2 genera; most in the N. Temperate and Arctic regions.

SALIX Linn.

Bracts entire. *Stamens* few, mostly 2, not exceeding 10. *Style* short; with 2 stigmas. *Leaves* mostly narrow.

Species 160; 1 each in Sumatra, S. Afr., Chili-Patagon.; a few in Mex.; the rest northwards in Eurasia and Amer.

S. HUMBOLDTIANA Willd. (*S. magellanica* Poir.)

A tree with strict vimineous branches, glabrous. *Leaves* lance-linear, attenuate, denticulate, exstipulate. *Catkins* on leafy branches, stalked, dense. *Capsules* ovate-conical, long-pedunculate. *Stigmas* sessile.

N. Patagon. Mouth of Rio Chubut. (Dusén.)

Family 23. FAGACEÆ. Beech Family (with oak, etc.).

Monœcious trees or shrubs, with alternate, simple, petioled, mostly serrate, pinnately nerved *leaves*, the *stipules*, if any, deciduous. *Flowers* small, the *males* in cylindrical or globular catkins; the *females* 1 to several, enclosed in an involucre, whose bracts form a burr or cup for the fruit. *Perianth* single, 4–8-lobed. Stamens as many, or more. *Ovary* superior, 3–7-celled; *ovules* few; only 1 in the nut.

Species 375, widely distributed. The subfamily of beeches differs from the oaks and chestnuts by having the male flowers in globular axillary clusters and the nut 3-angled, mostly with folded cotyledons. The Antarctic beeches (*Nothofagus*, often called "birches" because of their small leaves), differ from the common or northern beeches (*Fagus*) thus:

Fagus. Male clusters stalked, many-flowered. Female flowers 2. Styles long.
Nothofagus. Male flowers solitary or in threes, in short axillary cymes. Female flowers 2 or 4. Styles short. Scales of the 4- (or 2)-parted cupule folding separately.

NOTHOFAGUS Blume.

Style small; *stigma* capitate. *Leaves* usually 2-ranked.

Species 12; in Antarctic S. Amer.; 4 in N. Zeal.; *N. cunninghami* forming groves in S. Australia and Tasmania. Also fossil.

Of the Patagonian and Chilian forms some are evergreen with flat leaves, others have deciduous leaves plicate along the lateral nerves.

Key to the Species.

A. Young leaves folded along the lateral nerves. Deciduous.
  b. Female flowers in 3's, enclosed by a 4-merous fruit-cup.
    c. Leaf-blades 2–5 cm. long, undulate, bluish-green on under surface. Lobes of fruit-cup with short, flat, green dorsal processes. *N. obliqua.*
    *c*2. Leaf-blades of non-flowering or fruiting shoots 10–12 cm. long, not undulate. Lobes of the fruit-cup with long, leafy, pinnatifid, green appendages. *N. procera.*
    *c*3. Leaf-blades 2–2.5 cm. long, somewhat wavy and lobed. Lobes of fruit cup with 3–4 horizontal, short red processes, incised on apical margin. *N. antarctica.*
    *c*4. Leaf-blade 2–2.5 cm. long, very reticulate. Lobes of fruit-cup not appendaged. *N. montagnei.*
  *b*2. Female flowers solitary. Fruit-cup with 2 small lobes. Narrow. *N. pumilio.*
*A*2. Young leaves flat. Leaves persisting; trees evergreen.
  b. Leaf-blade lanceolate, dark-green. Male flowers in 3's. *N. dombeyi.*
  *b*2. Leaf-blades ovate-elliptical, dark-green, glandular underneath. Male flowers solitary. *N. betuloides.*
  *b*3. Leaves trapezoid-ovate, yellow-green. Male flowers in 3's. *N. nitida.*
*A*3. Of doubtful place and character. *N. alpina.*

(I) *Leaves* plicate along the lateral nerves, deciduous.

1. N. ANTARCTICA (Forst. sub *Fagus*) Blume. (*Fagus alpina* Poepp. of DC. Prodr., non Poepp. & Endl.)

Leaves deciduous, plicate in vernation, ovate or elliptical, obtuse, somewhat obliquely truncate at base, bidentate or bicrenate, the lateral nerves

tending to the sinuses, glabrescent above, pubescent at margin and on petiole underneath. *Male perianth* funnelform, obtusely lobed. *Anthers* slightly exserted, long, mucronulate. *Fruit* ovoid, its scales 1-seriate, rounded, ciliate. *Nucules* puberulous (Fig. 59).

Fig. 59.

Nothofagus antarctica. Flowering branch with leaves, staminate flower and fruit. (After *Flora antarctica.*)

S. Chili, and S. Patagon., and through Fuegia to Cape Horn. In Cordilleras of S. Patagon. "the most abundant tree." (J. B. Hatcher. Fruiting March 8); Staaten I.

Both kinds of flowers are on adjacent branches. "Bark rough, fruit small." (R. O. Cunningham.)

The varieties are numerous.

Nothofagus antarctica bicrenata (*N. pumilio*, O. Ktze.). N. antarctica latifolia F. Kurtz.

Leaves membranous, glabrous, orbiculate-ovate, lobed, acutely toothed, lateral nerves 3–4, prominent underneath.

Beagle Channel, Navarin I.

N. antarctica palustris Alboff.

Shrub, over 1 meter high, the younger branches pubescent. *Leaves* small, ovate, coriaceous, shining above, pale underneath, glabrous, glandulous margin crisp, crenulate, the teeth thick-margined, reticulately venous, with the 3–4 lateral nerves prominent underneath. Near *N. antarctica uliginosa.*

Navarin I. and Olivaia, in bogs.

N. antarctica subalpina Alboff.

As *N. antarctica palustris*, but the *leaves* larger (2 cm. by 18 mm.), more glabrous and subduplicately crenulate.

Beagle Channel, subalpine above Ushuaia, where it forms impenetrable thickets, low and twisted intricately like a wall.

N. antarctica sublobata.

Leaves undulate, few-lobed, and frequently dentate-crenate.

Patagon.; Fuegia, near Cape Horn. (Plate XIV.)

NOTHOFAGUS ANTARCTICA ULIGINOSA DC. (*Fagus uliginosa* Phil.)

Leaves undulate-margined, frequently crenulate-toothed; on both sides, especially on the nerves beneath and on the petioles, finely pubescent with minute, erect *hairs*.

(Chili); Patagon. In swamps, often as a shrub with small leaves. Nerves 4–5 on both sides. Chubut, in Andine woods.

2. N. MONTAGNEI (Humb. & Jacq.) Reiche.

Older *branches* cinereous, younger purple, these with short, golden *hairs* on one side. *Leaves* shortly-petioled, ovate, obtuse, basi-truncate, coriaceous, shining, pale underneath, very reticulate, 4–5-lobed and crenate. Lateral *nerves* 3–4 on each side. *Involucral lobes* 4, oblong, scarcely appendaged. *Nutlets* winged, 3 in each involucre, not ciliate. Leaves smaller than in *N. antarctica* (Fig. 60).

FIG. 60.

Nothofagus montagnei. Leaves and (to right) involucre. (After Dusén.)

Chonos Archip.

3. N. OBLIQUA (Mirb.).

Leaves deciduous, plicate in vernation, elliptical or ovate, obtuse, irregularly biserrate, the base entire, pilose on the nerves, 18–36 mm. long and half as broad, the teeth varying in the same leaf. *Male perianth* sinuately lobed, *anthers* longer than the filaments. *Fruit* ovoid, its scales ovate-lanceolate, not spreading.

Chili to Magellan, replacing *N. antarctica* in Chili, and reaching the sea-level at Magellan. Native name "Roble."

4. N. PROCERA (Poepp. & Endl.).

Leaves oblong, more rounded at base than at apex, shortly and hirtly petiolate, rather large to 10 cm. long, biserrate with 3–4 rather large denticulate crenæ, glabrous on upper, pubescent on under surface, margin ciliate. Flower? Fruit? Lofty tree. "Rauli."

(Chili); Patagonia?

5. P. PUMILIO (Poepp. & Endl.) Blume.

Perhaps a variety of *N. antarctica* with *leaves* regularly bicrenate, or more closely and deeply serrate, and pubescent on both surfaces. "Species most distinct from *N. antarctica*." (Speg.)

Patagon.; S. Fuegia (Dusén); S. Patagon., by Hatcher. (Hatcher's specimen bore the moss *Dicranum cirrhifolium* C. Muell.) W. Patagon. "forming groves by the river Aysen, up to an elevation of 1,000 meters, and up to 1,300 meters as mere shrubs growing in thickets." (Dusén.)

(II) *Leaves* not plicate, mostly *evergreen.*

6. Nothofagus betuloides (Mirb.) Blume.

Leaves plane, ovate or elliptical, obtuse or subacute, their base unequally acute or obtuse, coriaceous, evergreen, crenate-serrate, glabrous, short-petiolate, glandulous-punctate underneath. *Male flowers* solitary, very short-pediceled, perianth broad-funnelform, obtusely 4–7-lobed, *anthers* callously mucronulate. *Fruits* solitary, axillary, lobes of the 4-partite *involucre* oblong with erect filiform segments as long as the nucules (Fig. 61).

South Chili and S. Patagon., through Fuegia to Cape Horn, very abundant; the common evergreen beech of Fuegia. Fuegian name, "Ouchpaya." The coasts of West Magellan are covered by this and *Drimys winteri.* (Dusén.) By Hatcher in the Cordilleras of S. Patagon., bearing the parasitical *Myzodendron punctulatum.* Feb. 18. "Bark smooth, gray." Staaten I.; West Patagon. at a high elevation. (Dusén.)

Fig. 61.

Nothofagus betuloides. — Leafage: staminate flower (on right), and pistillate flower (on left). (After *Flora antarctica.*)

7. N. dombeyi (Mirb.) Oerst.

Leaves plane, evergreen, elliptical-ovate or oblong, acute or obtuse both ways, coriaceous, serrate, glabrous, short-petiolate. *Staminal clusters* much shorter than the leaves. *Fruits* solitary, axillary; the lobes of the 4-partite *involucre* oblong, 2–3-laciniate, shorter than the nuts.

South Chili, valuable wood, "coique." Patagon., Chubut; in Præandine woods near Rio Carren-Leofú.

8. N. nitida Phil.

Branchlets cinereous, the season's with dense, short, golden hairs, appressed upwards. *Leaves* short-petiolate, most ovate-lanceolate, coria-

ceous, very shining, serrate, glabrous, the young gold-hairy on petiole and nerves. *Involucre* of the female flowers sessile, the young with scarious scales, enclosing *five* obtusely trigonal nutlets. Male flowers?

S. Chili; Patagon. "Coihue" and "Roble." Except *Cipres* (*Libocedrus*) it constitutes almost exclusively the forests of Guaitecas and Chonos.

(III) "Of doubtful place." (Reiche.)

9. Nothofagus alpina (Poepp. & Endl. sub *Fagus*).

Leaves ovate-lanceolate, basally rotundate, serrulate, rough on both sides, ciliate, glutinous above. *Involucral* lobes ovate, dorsally and marginally appendiculate; the appendages incised or multifid, glandular.

(S. Chili); Patagonia.

(Not *Fagus alpina* Poepp., of DC. Prodr., which is *F. antarctica* Forst.)

Dusén gives the following species of Fagaceæ as occurring in a fossil condition in Fuegia or Patagonia:

Fagus dicksoni Dus., at Barancas de Carmen Sylva, Fuegia.

F. integrifolia Dus., at Barancas de Carmen Sylva, Fuegia.

F. subferruginea Dus., at Barancas de Carmen Sylva and at Punta Arenas.

Nothofagus australis Dus., at Barancas, Rio Condor and Rio Guillermo.

N. crenulata Dus., at Rio Guillermo.

N. densi-nervosa Dus., at Barancas, Rio Condor and Rio Beta.

N. elongata Dus., Barancas.

N. lanceolata Dus., at Barancas, Rio Guillermo, Punta Arenas.

N. magellanica Engelh., Barancas.

N. cfr. *obliqua* Mirb., Conception.

N. serrulata Dus., Barancas and Punta Arenas.

N. simplicidens Dus., at Barancas, Rio Condor, Punta Arenas.

N. variabilis Dus.

Family 24. Urticaceæ. Nettle Family.

Usually herbs with watery sap, simple, alternate or opposite *leaves*, mostly stipulate, and often with stinging *hairs;* and clusters of small, sexually distinct, apetalous *flowers*. *Calyx* 2–5-parted, *stamens* as many, opposite its lobes. *Filaments* reflexed and anthers reversed in the bud.

Ovary free, 1-celled; *style* 1, undivided; ovule 1. *Fruit* an achene, with scanty *endosperm.*

Species 1,500, in warm and temperate countries.

KEY TO THE GENERA.

A. Perianth consisting of 2–5 distinct leaves. Foliage-leaves opposite.
1. Stinging. Flowers 4-merous. Achene enclosed in one of the two larger sepals. *Urtica.*
2. Not stinging, smooth and shining. Flowers mostly 3-merous; their sepals unequal, all, or all but one, small. Achenes partly naked. Leaves of a pair unequal. *Adicea* (*Pilea*).

A2. Perianth symphyllous, tubular or campanulate in the fertile flowers. Plants not stinging. *Parietaria.*

1. URTICA Linn. Nettle.

Leaves opposite, petiolate, serrate or incised, with stinging hairs, and distinct or connate stipules. *Flowers* 4-merous, in axillary clusters, diœcious or monœcious or androgynous. *Achenes* compressed, enclosed in the persisting *calyx.*

Species 30, widely dispersed extratropically.

1. U. DARWINII Hook. f.

Stem slender, erect, sparsely pilose, or even glabrous. *Leaves* membranaceous, ovate-acuminate, coarsely crenate-serrate, rounded at base, 3-nerved, finely punctate, puberulous; petiole slender; *stipules* linear-oblong, subacute. *Flowers* glomerate, in slender, setose, interrupted *spikes* longer than the petiole. (Larger flowers and achenes than *U. dioica.*)

Chonos Archip.

2. U. DIOICA Linn.

Root perennial. *Stem* erect, the whole plant stinging or smooth. *Leaves* ovate-acuminate to ovate-lanceolate, serrate, cordate or rounded at base; *stipules* in pairs between the petioles. *Spikes* in pairs, mostly diœcious, much branched, exceeding the petiole, pendulous in fruit.

(N. Temperate zone, fig. in Brit. & Br. i, 531); Magellan. (Dusén.)

3. U. MAGELLANICA Poir.

Stem stout, erect, hispid. *Leaves* subcoriaceous, rugose, ovate to ovate-lanceolate, acuminate, basicordate, acutely serrate-dentate, setose on both sides; stipules linear-oblong, acute. *Glomerules* setose, in interrupted spikes, shorter than the petioles or longer.

S. and W. Patagonia; Magellan. Fuegia to Cape Horn.

("One of Anson's ships had its crew cured of scurvy by nettle-tops at the west part of Magellan Strait; 1742.")

4. URTICA SPATULATA Smith.

Stem erect or ascending, to 30 cm. high. Glabrous between the stinging hairs. *Leaves* small, rotundate, basi-cuneate, incised, with lanceolate, acute teeth; petiole exceeding the limb; *stipules* interpetiolar. *Clusters* crowded, shorter than the petioles. The larger segments of the fruiting *calyx* unarmed.

S. Brazil; common about Bahia Blanca, and probably in N. Patagon.

5. U. URENS Linn.

Annual. *Stem* stout, 40 cm. tall, stinging-bristly, leafy to the top. *Leaves* thin, nearly glabrous, elliptic-ovate, deeply incised or biserrate, 3–5-nerved, all slender-petioled. *Spikes* in pairs, oblong, subsimple, shorter than the petioles. *Achenes* granulate.

(Eur., nat. in N. Amer., fig. in Brit. & Br. i, 532.)

N. Patagon., in cultivated places near Carmen de Patagones. Magellan, introd.; Fuegia, at Ushuaia, rare.

2. ADICEA Raf. (1815). (*Pilea* Lindl, 1821). Clearweed.

Monœcious or dicœcious, with axillary *cymes* and not stinging. *Male flowers* 4-merous, rarely 2–3-merous, with rudimentary ovary; *female flowers* unequally 3-merous, with staminal rudiments. *Leaves* opposite, *stipules* connate into a single interpetiolar stipule. *Bracts* small, rarely a few larger.

Species 150, most in trop. Amer.

A. ELLIPTICA (Hook. f. sub *Pilea*).

Stem low, sparsely branching. *Leaves* long-stalked, membranaceous, elliptical, subobtuse, coarsely crenate-serrate, 3-nerved; pubescence minute-appressed (due to raphides). *Male flowers* in a long-stalked, capitate umbel; *female flowers* glomerate, sessile. *Achene* orbicular, compressed, obliquely emarginate.

Chonos Archip.

3. PARIETARIA Linn.

Herbs, mostly diffuse, with 3–8-flowered, androgynous, axillary *cymules* of 4, rarely 3-merous *flowers*. *Leaves* alternate, entire, 3-nerved, exstipulate. *Fertile flowers* sometimes hermaphrodite, with a tubular or campanulate, 4-lobed calyx, free from the involucral bracts. *Stigma* short or linear, tufted.

Species 8, chiefly in temperate regions of both hemispheres.

P. DEBILIS G. Forster.

Annual, with erect or diffuse *stem*, and ovate, or rhomboid, or subrotund *leaves*. *Cymes* few-flowered. *Bracts* linear or lanceolate, scarcely enlarged in fruit.

(Subtropical); Chubut, in cultivated fields.

Family 25. PROTEACEÆ.

Shrubs or trees, rarely perennial herbs; with exstipulate leaves, and 4-merous flowers with single symphyllous, hypogynous *perianth;* the 4 *stamens* inserted on and included in the perianth. *Ovary* 1-celled, with terminal style. *Seeds* mostly 1–few, without endosperm.

Species 1,000, most in Austral. and S. Africa; few in the Orient and S. Pacific Is. and S. Amer.

("All the American species belong to the section having flowers in pairs, enclosed by the bract." R. Brown, 1811.)

KEY TO THE GENERA.

A. Leaves simple. Perianth-tube cleft behind. Seeds usually more than 4.

b. Shrub with terminal racemes of red flowers. Capsule long, leathery or almost woody. A ring-formed hypogynous disk. 1. *Embothrium.*

b2. Trees or shrubs with axillary or terminal racemes. Capsule leathery, broad and flat. Hypogynous disk represented by 3 broad, truncated, glandular processes. 2. *Tricondylus* (*Lomatia*).

A2. Trees with alternate, pinnate leaves, and axillary racemes of white flowers, having cylindraceous perianth-tube, the segments separating from the base. Hypogynous disk a fleshy, 2-lobed half-ring. Seeds 2, rarely 4, becoming coral-red "hazel-nuts." 3. *Guevina.*

1. EMBOTHRIUM Forst.

Evergreen shrubs, with sparse, coriaceous, entire *leaves*, and dense, terminal *racemes* of geminately pediceled red *flowers*, with none or a few

minute *bracts*, and a semiannular, fleshy, hypogynous *disk*. *Perianth-tube* cylindrical, cleft behind. *Ovules* many, becoming samaroid.

Species 4, in Extratropical S. Amer.

1. EMBOTHRIUM COCCINEUM Forst.

Leaves subsessile, oval, obtuse, attenuate basewards, underneath opaque-pale, and veinless; veiny and shiny above. *Pedicels* shorter than the calyx, and *style* as long, its apex fusiform.

Handsome; fig. in Eng. & Prantl, iii, 1, p. 123, C., & p. 149, A–D.

S. and W. Patagon., by Lago Argentino, Cabo Negro, Magellan; Fuegia to Cape Horn; at Lago Nahuel-huapi. (Dusén.)

E. COCCINEUM OBLANCEOLATUM O. Ktze.

Leaves of floriferous branches oblanceolate, rather obtuse, broad above.

(Chili); Patagon.

E. COCCINEUM OBOVATUM O. Ktze.

Leaves short, obovate, 1–3 cm. broad, rather obtuse.

(Chili); Patagon.

2. E. LANCEOLATUM R. & P.

Leaves short-petioled, oval-oblong, lanceolate, or narrower, obtuse, mucronulate, attenuate basewards or both ways, discolored, opaque or shining above, 1-nerved, nearly veinless. *Pedicels* as long as the calyx, 25 mm.; stigma oblong-fusiform, smooth.

(S. Chili); Chubut, in shrubberies by the hills.

2. TRICONDYLUS Kn. & Salisb. (*Lomatia* Br.).

Trees or shrubs, with *racemes* of geminately pediceled flowers. *Perianth-tube* oblique, cleft behind. Hypogynous *glands* 3. *Stigma* on a lateral disk. *Ovules* many, becoming samaroid.

Species 9, Chili, E. Austral. and Tasmania.

1. T. DENTATUS (R. & P.) O. Ktze.

Leaves oval, serrate-dentate, glabrous as the *petals*. *Racemes* lateral, abbreviate. *Calyx* pilose. *Ovary* tomentose.

(Chili); Patagon.

2. TRICONDYLUS FERRUGINEUS (Br.).

Leaves most opposite or whorled, bipinnatifid, woolly when young. *Perianth* short, dilated below. *Seed* sometimes winged, as in other Chilian species, sometimes wingless as in Australian species.

(S. Chili); Chonos Archipel.; Magellan. (R. O. Cunningham.)

Near Lago Nahuel-huapi.

3. T. OBLIQUUS (R. & P.) O. Ktze.

Leaves ovate, serrate, glabrous. *Racemes* axillary, the *pedicels* and *calyx* pilose. *Stigma* deciduous.

(Chili); Patagon., Chubut.

T. OBLIQUUS ALNIFOLIUS (Poepp.).

Leaves densely toothed, the teeth often rather acute. *Racemes* generally shorter than the leaves.

(Chili); Chubut, in mountain groves.

3. GUEVINA Molina.

A tree, with unequally pinnate *leaves*, having toothed leaflets. *Flowers* paired, pediceled, in long, axillary racemes. *Bracts* minute, caducous, or none. *Perianth-limb* recurved; anthers subsessile on the lobes. *Ovules* 2, rarely 4, collateral. *Drupe* 1-seeded, size of a cherry, coral-red, edible, "Chilian hazel-nut."

Species only 1, viz:

G. AVELLANA Molina.

Leaflets 2–5 pairs, short-petioled or sessile, ovate or cuneate-obovate or subrotund, 3–10 cm. long. *Racemes* dense-flowered, tomentose.

(Chili); W. Patagon.

Family 26. LORANTHACEÆ. Mistletoe Family.

Green parasites on woody plants. *Leaves* mostly opposite. *Flowers* either perfect or diœcious or monœcious, with single or double, regular perianth. *Perianth-tube* adnate to ovary. *Stamens* 2–6, epiphyllous. *Ovary* 1-carpellary, 1-seeded. *Style* 1 or none; *fruit* a berry. *Endosperm* large.

Species 500, mostly in warm countries, radiating from the Himalayas; to Austral. and N. Zeal.; through Afr.; few in Eur. and N. Amer.; several in Chili.

LORANTHUS Linn.

Flowers hermaphrodite or abortively diœcious. *Perianth* double. Shrubs with entire thickish *leaves*.

Species 320, many in S. Amer.; none in N. Amer.

1. L. CUNEIFOLIUS Ruiz. & Pav.

Leaves subsessile, cuneiform, subacuminate, shining. *Peduncles* 1–3 in the axils, 1-flowered, one third as long as the leaf. *Petals* 6, linear-spatulate. *Berry* black.

(S. Brazil); N. Patagon.

2. L. TETRANDRUS Ruiz & Pav.

Leaves ovate, obtuse, subcordate, coriaceous. *Corymb* subsessile, of many 4-merous, scarlet flowers. *Pedicels* short, pubescent, 3-bracted. *Corolla-lobes* cochleariform, acute.

(Chili, called "Quintial"); Patagon. ("Flowers crowded," R. O. Cunningham.)

(Most of the species of *Loranthus* are of the Old World, and tropical, from Himalaya to Australia, New Zealand, and through Africa. Here where seeds are carried by birds and over oceans, several genera have representatives both in Australia and in South America; as *Gaiadendron*, *Phrygilanthus*. Also *Tupeia* of New Zealand is close to *Lepidoceros* and *Antidaphne*, confined to the Andes. These facts with others point to a former subtropical, subpolar vegetation.—A. Engler.)

Family 27. MYZODENDRACEÆ. Angels'-beard. (Plate XIV.)

Diœcious, leafy or leafless shrubs, of the habit of Mistletoe, *parasitical* on the branches of beeches in the southern parts of South America.

Flowers small, in catkins or racemes; the *male flowers* without perianth, having 2–3 one-celled *anthers* on top of a column around a depressed gland; the *female flowers* with a single, 3-parted *perianth*, adnate to the trigonal *ovary;* from whose corners issue 3 *setæ*, which in fruit become long, hairy appendages.

Only 1 genus, with 12 species, all in Chili, Patagonia, and neighboring islands.

MYZODENDRON Banks & Sol. "Barba de Anjel."

(Figures in Eng. & Prantl, iii, 1, p. 200, and fine plates in Hook., Fl. Antarct.) The plumes may anchor the achenes on branches of trees till they germinate.

1. M. BRACHYSTACHYUM DC.

Leaves narrow, oblong, nearly nerveless. *Flowers* in axillary racemes. *Stamens* 3. *Plumes* 6 times as long as the fruit.

S. Patag., Cabo Negro; Magellan; Fuegia; Staaten I. (Not common.)

"Twigs thicker than in *M. punctulatum*." (R. O. Cunningham.)

2. M. LINEARIFOLIUM DC.

Glabrous. *Leaves* linear, acute. *Flowers* sessile, solitary in the axils on the flowering branches.

(Chili); S. Patagon., Cabo Negro. (Dusén.)

3. M. MACROLEPIS Phil.

Patagon., on branches of beech, near Lago Nahuel-huapi.

4. M. OBLONGIFOLIUM DC.

Leaves oblong to linear-lanceolate, larger than in the preceding. *Flowers* in axillary racemes. *Plumes* about 18 times as long as the fruit.

(S. Chili); Magellan. Fuegia.

5. M. PATAGONICUM Speg.

Slender, erect, densely fastigiate-branching, terete, all yellow-ferruginous, glabrous, but minutely and densely verruculose. *Leaves* very few, alternate or opposite, linear, small, submembranaceous, lutescent-green, glabrous. *Spikes* acrogenous, continuous with the supporting branchlets. *Rachis* slender, leafless, erect. *Spikelets* mostly geminate-opposite, 5–7-jugous, the pairs remote, cylindraceous, small, patent, about 10-flowered. *Scales* obtuse, glabrous, 2-flowered.

Patagon., in dense woods near Nahuel-huapi; parasite on ?.

6. MYZODENDRON PUNCTULATUM (Banks) Sol.

Leafless; the branches with projecting disks depressed in their center. *Staminal* flowers in catkins; *stamens* 2. *Achenes* 4 mm. long; *plumes* about 10 times as long.

Common everywhere in Patagon. By Hatcher on *Nothofagus betuloides* Mirb. at Punta Arenas; in fruit Feb. 18, 1897. Fuegia, *passim*, on *Nothofagus antarctica*. Staaten I. (Plate XIV.)

7. M. QUADRIFLORUM DC.

Leaves small, broad, obtuse. *Flowering* branches long, bearing 1-leaved branchlets, alternating; each branchlet 3–5-flowered. *Achenes* linear; *plumes* slender, with brown, naked top.

S. Patagon.; Magellan; Staaten I.; S. Fuegia, Ushuaia, Navarino (rather rare).

8. M. RIOQUINOËNSE O. Ktze.

Leafless, 20 cm. long, much branching, all brownish-yellow. *Branches* terete, suberect, everywhere punctulate-warty. *Spikes* sessile, dense, 10-flowered, scarcely 1 cm. long. *Bracts* cup-like, very remote in the upper, sterile branches. *Setæ* 3, 3 times exceeding the fruit; barbate-pilose, the hairs one third as long as the seta. *Ovary* cylindrical; *stigma* sessile, conical, scarcely 3-lobed. Male plant unknown. Parasite on Beech.

(Chili); Chubut, woods along Carren-leofú, and by Rio Aysen in W. Patagon.

Family 28. SANTALACEÆ. Sandalwood Family.

Mostly herbs or shrubs, with entire, exstipulate *leaves* and greenish, apetalous *flowers*, perfect or diclinous. *Calyx* adnate to the ovary, 5–6 lobed, bearing as many *stamens*. *Ovary* 1-locular; ovules 2–3, pendulous; *style* simple. *Drupe* or nut, having 1 seed, with large *endosperm*.

Species 250, chiefly tropical.

KEY TO THE GENERA.

A. Tube of the more or less epigynous perianth not produced above the ovary, or produced and then covered by the disk. Fruits drupaceous.

b. Disk entire, or only ventricose-lobed.

c. Flowers 4-merous, in 1–3's, subsessile among the uppermost leaves. Perianth-leaves free to the disk. Low herb, with linear leaves. 1. *Nanodea*.

EXPLANATION OF PLATE XII.

PAGE

CAREX PATAGONICA Spegazzini 285

The central figure gives the general habit, of natural size.

On the right, above, are two young plants, slightly magnified.

ad, andrecium on the staminal scale.

l, *l*, two young leaves, their sheathing bases and short laminæ.

s, seed (achene) with its 3-branched style. To its left is seen the utricle enclosing the seed.

sa, superior aspect of seed (achene).

sp, female spike, with its bracts and scales.

str, *str*, cross-sections of young and maturing seeds.

su, superior aspect of utricle.

Figures *ad*–*su* are all magnified.

F v Iterson del, J N Fitch lith. West, Newman imp

CAREX PATAGONICA *(Speg)*

EXPLANATION OF PLATE XIII.

PAGE

PHILESIA BUXIFOLIA Lamarck 309

The central figure gives the general habit, of natural size.

ad, andrecium, enclosing the apex of the style.

f, fruit.

lb, leaf and bracts.

ov, ovule.

ovs, ovary in transverse section.

tp, an inner tepal; beside it is one of the small outer tepals.

(*ov* and *ovs* are slightly magnified.)

F. v. Iterson del., J. N. Fitch lith. West, Newman imp.

PHILESIA BUXIFOLIA, *Lam.*

EXPLANATION OF PLATE XIV.

PAGE

Species of MYZODENDRON 337

General figure shows the fruiting. *Myzodendron brachystachyon* DC., on a branch of the Southern deciduous Beech (*Nothofagus antarctica*, Forst., Blume); of natural size.

b, a branch of *M. brachystachyon*, slightly magnified.

f, its fruit, magnified.

n, one of its nodes, slightly magnified.

B. Fragment of a branch of *Myzodendron punctulatum* (Banks) Sol. . 338

F. v. Iterson del., J.N. Fitch lith.

West, Newman imp

MYZODENDRON BRACHYSTACHYUM, *D C*, on Nothofagus antarctica (*Forst.*)
B, branch of M. punctulatum, *B & S.*

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